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Building Conditions Continue to Show Improvement

Kragstone dealers in many sections are now doing a bigger business than ever before. Building conditions continue to show a marked improvement.

Every contractor who puts on Kragstone can do a good business through the Fall and Winter for Kragstone can be applied just as well in cold weather as in warm. Get all the business you can now. Every indication points to a rush of Kragstone business in

the spring. Get orders at once while you have time to put it on.

There is opportunity at this time of year especially to get business in overcoating old houses.

If you are not getting your share of Kragstone jobs ask the Kragstone dealer in your town to help you. There is profit in it for you and for him and one job well done means many more in the future.

AMERICAN MAGNESIA PRODUCTS CO.
Roosevelt Road, Chicago, Illinois

KRAGSTONE

The STUCCO BEAUTIFUL

Short Talks by the Editor

History-Making November

NOVEMBER has been chosen among the many months of the year to be one of the most important in world's history. Three years ago it marked the end of the world's greatest catastrophe, the great war, and this year it marks the opening of a new spirit of co-operation among nations never before approached. For on Nov. 11, three years to a day after the armistice was signed, the great disarmament conference opens under the most auspicious circumstances. On that day the unknown hero will be buried at Arlington—symbolic of the sacrifice in the recent war.

With him the nations hope to bury all possibility of future wars with their crushing debts and toll. Around the conference table at Washington will be assembled the great nations of the world seeking hopefully to find a formula for eternal peace. Peace means prosperity, war destruction. We are carrying the burdens of many wars now to the detriment of public progress. If we can but reach some definite agreement whereby some of the staggering expenses of the military establishment thruout the world are lessened, it will be a forward step indeed. We await the outcome of this important conference with keen hope.



Advertising Your Business by Plan Books

DOING business without advertising is like winking at a girl in the dark. You know what you are doing but nobody else does.

At this very moment there may be four or five people in your locality who are thinking of building a new home some time in the very near future but they do not know what you can do for them. You haven't bothered to tell them about it.

One of the most effective means of getting your business before these people is to send them a beautiful book of homes with floor plans. Today homes are just as scarce as hen's teeth. People are as home-hungry as they were sugar-hungry during the war. Mention the subject and they are all eyes and ears.

To boost your business you have to employ the arts of a vampire—only in your case this book of homes will be your syncopated orchestra. It is the gentle beguiling influence that leads the client down the right road to future independence. It is strange to say that people have to be tempted to do the right thing but that is human nature—perverse as the mule and very often not one whit as wise. We are offering to assist you in this tempting business because we think it is worth while. And for that reason we have spent time, thought and money to get out an appealing and attractive book which you can place in the hands of your customers at very small cost. Moreover it will be an excellent advertising medium, for you can

have your name printed on each book that you hand out to your prospective customer.



Blue Ribbon Homes Are Popular

WE ARE not in the habit of praising ourselves but we can't refrain from being a little cocky over the way we are being complimented about the new series of Blue Ribbon Homes. They have attracted favorable comment from hundreds of builders and architects all over the country.

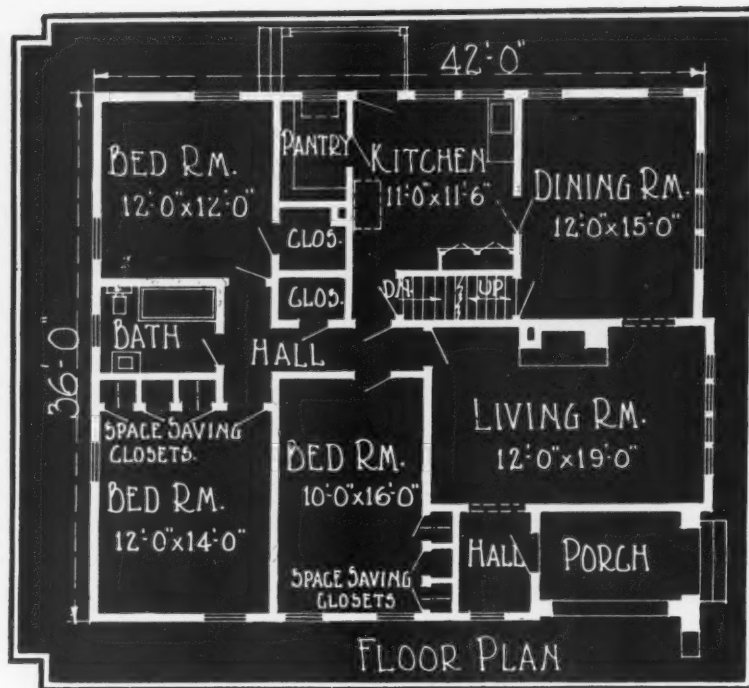
We are not making the mistake, however, that some people do when they are patted on the back, of riding along on the wave, but are going ahead stronger than ever. This month we show over a dozen Blue Ribbon designs, every one of them a gem, but practical and substantial. Now that your clients are beginning to call upon you for home plans for next spring it will not be a bad idea to have all of these Blue Ribbon home designs handy where you can let your prospects see them. They might want to take them home to study them over. Not a bad idea. Your worries will be over immediately for those designs will sell themselves for all time.



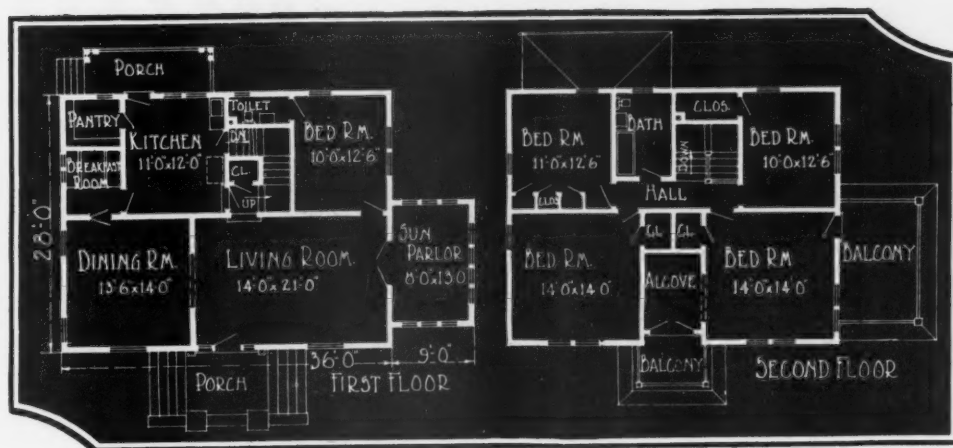
Preparing for Winter

NOVEMBER ushers in the first of the cold breezes and the snipping frosts that quicken the steps and make the blood flow faster thru the body. To the builder the winter season has always been a season of inactivity. In fact the idea has become so firmly entrenched in the mind that it is almost a sacred tradition. But the twentieth century threatens to smash another time-honored tradition. For the decree has gone forth that winter slack is only a psychological conditions and not based on actual necessity. In other words there is no valid reason why building should not continue thru the cold months.

Let us see if this is reasonable. During the war the demand for new factories did not permit of a slackening in building during the winter. Very much to the surprise of many people in the building field it was found that construction work could be carried on very efficiently during the very coldest weather. Methods of handling materials in cold weather were devised, especially in the concrete field. As a result, work went ahead full blast and buildings were practically started and completed during the cold months of November to February. Since that time many large building projects have been carried on uninterruptedly during the winter and there is every reason to believe that the cold weather which is now on our threshold will not be sufficient cause for the building profession to gather up their tools and retire into their holes like bears. There is no need for hibernation during winter. Work should go ahead without slackening.

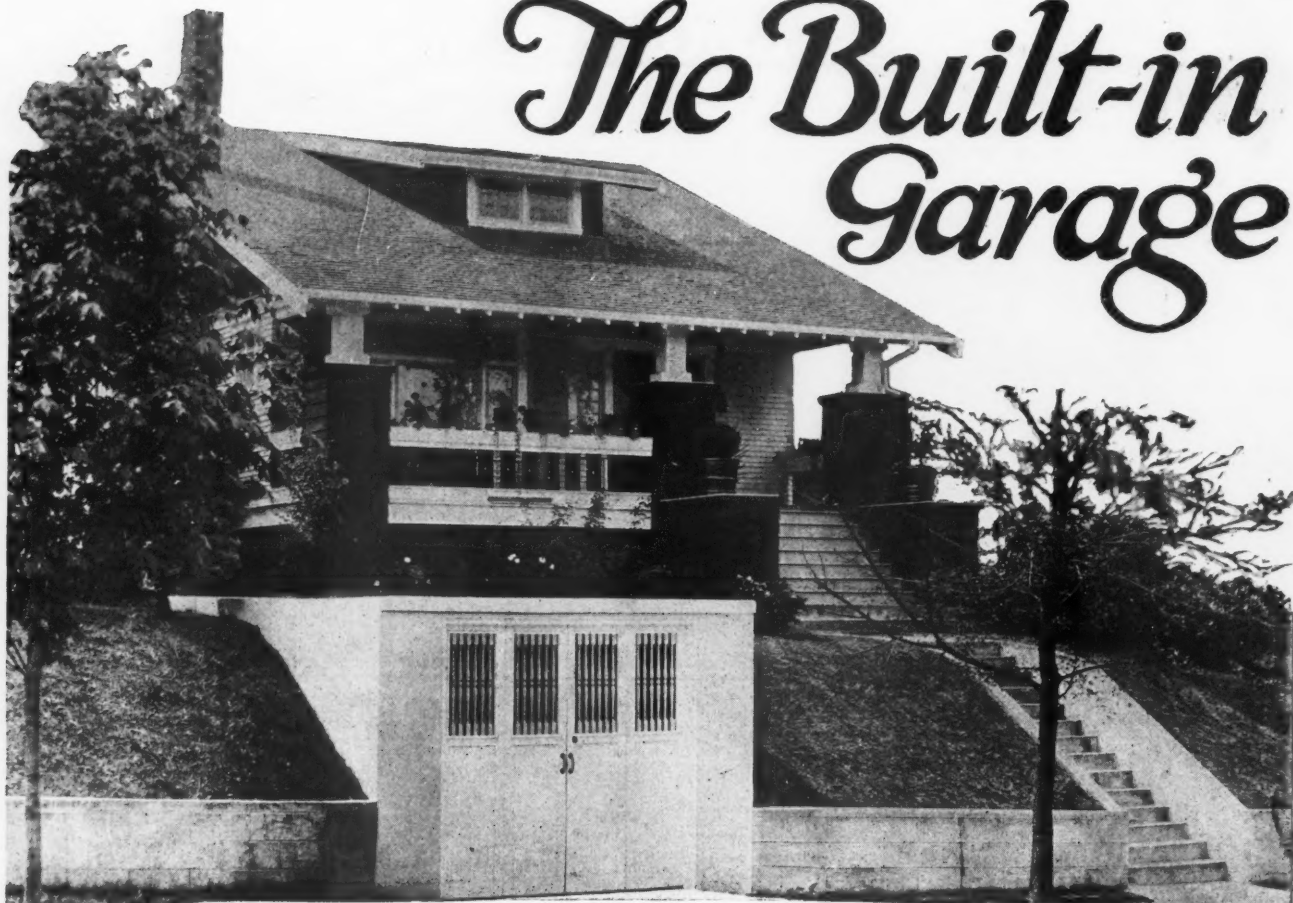


ORIGINALITY OF DESIGN IS THE KEYNOTE HERE. Inherent daintiness of decoration and style are the two appealing qualities of this quite original bungalow home. Requests for this small type of home exceed all others because of the independence this plan affords at small expense. This design is unusual in many respects, yet embodies that essential comfort which makes a real home. Striking features of the exterior are the recessed front entrance of brick and the wide siding, painted gray with white trim on doors and windows. The roof has been extremely well handled. External appearance fools a little in this instance, as this house has six comfortable rooms, being larger than it appears. Considerable space has been saved for the bedrooms by using space-saving closets. A high attic can be used if needed. Size, 36 by 42 feet.

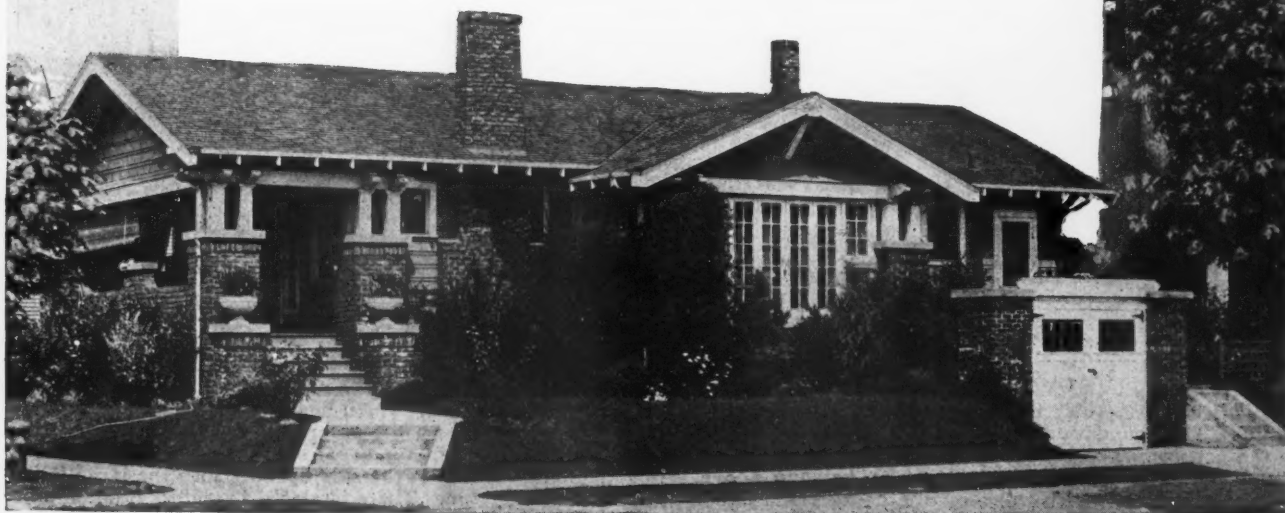


CONSERVATIVE, WELL-DESIGNED FAMILY HOME. For the larger family this type of house is appropriate. This is a two-story frame house of eight rooms, five of which are bedrooms, which insures facilities for a large family. The foundation is rock-faced concrete block and frame siding is used up the second floor with shingles above to the cornice. The roof is modified hip with one attic dormer. Variation from the usual style of the square house is found in the projecting sun parlor with balcony above. The main entrance is on the side opening into the large living room. A bedroom with toilet off the living room is convenient for guest room. There is also a breakfast nook adjoining the kitchen. The main bedrooms, four in number, are on the upper floor. Little space has been sacrificed for large, unwieldy closets. Size of house, 28 by 36 feet.

The Built-in Garage



IF you are drawing up plans for a home on a terrace, why not build the garage right in the house instead of putting your client to the extra expense of having a roadway dug out at street level? The built-in garage is a real convenience as well as an economy. Some novel ideas in this work are suggested in the pictures on these pages.



A LONG expensive driveway has been eliminated in the plan shown at top by building the garage in front. Nor has the beauty of the picture been marred. Just below (center) we have a subterranean garage built in the front yard at the edge of the high terrace. The grass grows above it. And in the picture at the bottom, the garage has been taken into the bosom of the family. In cold weather, it can be reached without going outside. When the family returns home late after a long and dusty ride, they can drive the car right into the house. Not so bad!



OUR FRONT COVER HOME BEAUTIFUL

BACK in the old days when chivalry ran rampant, and life was cheap, a man surrounded himself with turrets, battlements, bridges, and moats, and made the windows as small as possible for protection. Today the home-builder surrounds himself with things of beauty rather than those of strength, such as beautiful lawns, hedges, artistic fences, inviting porches and gardens, and builds as many and as large windows in his house as he consistently can without sacrificing all privacy. For he no longer fears the raids of marauding bands, but the caustic criticism of his friends and neighbors. To him his house is still a castle but a peaceful one.

Where the medieval home was mysterious and repelling, the modern home is frank and appealing. Open spaces, such as windows and porches, have done this. Our complete espousal of the fresh air doctrine has caused some radical changes in building ideas.

That is why the sun parlor and sleeping porch are today fundamentals of a home. They supply in large measure the air and sunshine which make the home a real place in which to live. They are the reasons for the beauty and appealing charm of the delightful front cover home of this issue. For here the distinctive feature of the whole house is the "sunshine" parlor built at one end of the house under a pergola roof. This porch has been skillfully encased in walls of glass which are really sets of folding and sliding casements fastened together in groups of five and two, with a split mullion, part moving each way. They can be pushed back close against the porch pillars opening the entire porch, or can be closed in cold and inclement weather. In the warm months screens can be placed

outside of these sash without interfering with their operation.

The house itself is an excellent example of the familiar square type hip-roof two-story home, always an economical house to build because of its simplicity in design, yet inheriting a real charm and warmth from its Colonial antecedents.

The exterior is stucco over hollow tile. If the latter is not desired it can be applied over wood or metal lath. The front entrance, located at one end of the main elevation, is distinctly Colonial in character. It is used without a cover, but has a small elevated porch about three steps above the ground level. The doorway consists of a double glass paneled door with small semi-circular arched flanking windows on each side. At the head of the short concrete steps on each side are ornamental flower pots.

Windows on the upper floor have oddly designed wooden shutters, which give the house a homey and quaint appearance. Windows on the lower floor are rather unusual, being small paned and topped off by a semi-circular arch. The roof is covered by a pleasing and artistic green tile.

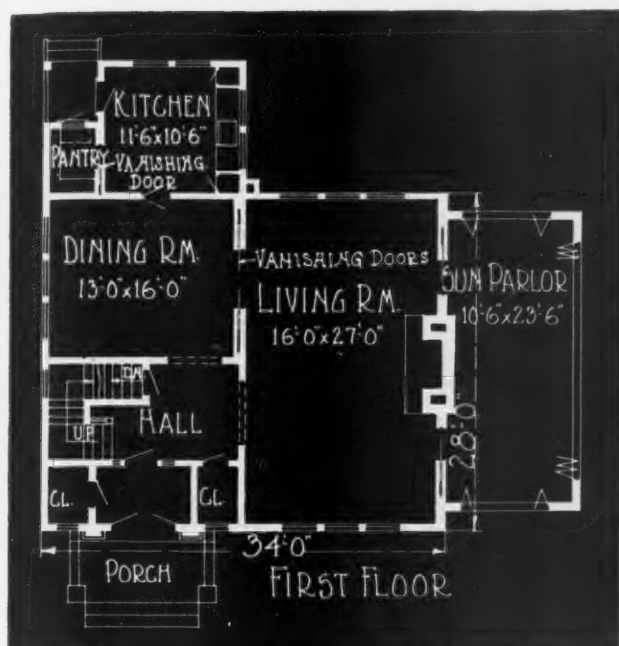
Inside the front door is a small vestibule with side clothes closets. An open doorway to the right leads into the large and spacious living room well worthy of its name, for it occupies about 450 square feet of space and represents the maximum of comfort. In the wall facing the side porch is a large open brick fireplace "blest with that charm, the certainty to please," and on each side of this fireplace are doors of the vanishing French type opening out to the sun parlor which has already been described. These doors slide into

pockets in the wall on each side of the door opening. Triple windows on the other side of the living room supplement the excellent light afforded from the sun parlor, and make the room one of cheer and warmth.

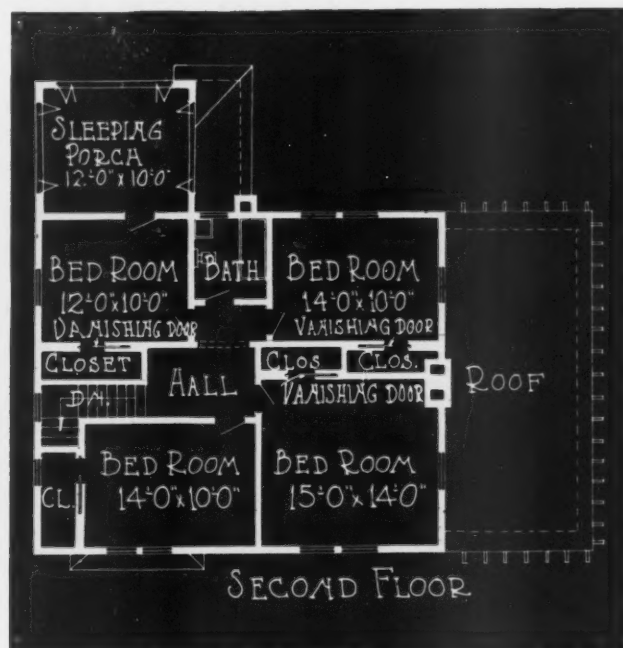
Opposite the sun parlor and opening into the living room by the same kind of sliding vanishing doors is the dining room, a room of appropriate size, 13 by 16 feet. It is connected with the kitchen by a swinging door. The kitchen is ideally located with regard to the service of meals and completely equipped. At one side is a small pantry fitted with a disappearing door, thus eliminating any inconvenience from swinging doors in



Bright, Sunshiny Living Porches Are Now an Essential of Every New Home. On Cold Days they Make an Ideal Playground for the "Kiddies"; on Warm Days, a Cool, Shady Spot for the Family.



First Floor Plan of Front Cover Home.



Second Floor Plan of Front Cover Home.

the small kitchen.

On the second floor the sleeping rooms have been segregated. They consist of four bedrooms and a sleeping porch located in the wing above the kitchen. The bedrooms are very generous in size, being 12 by 10, 15 by 14, and two 14 by 10 feet. Each bedroom has windows on two sides and the sleeping porch is equipped with the same type of sliding and folding casement window as the sun parlor. Disappearing sliding doors are installed in the closets.

In building closets one of the most common troubles is the hanging of the door. If it opens in, it is generally in the way and only takes up valuable room. If it opens out, it very often interferes with the main bedroom door. If this trouble cannot be eliminated by a

change in location of the closet, it can be very efficiently solved by the use of disappearing sliding doors of the type that have been used in this home. These closet doors disappear into the wall between the studding. All of the closets in the bedrooms have been fitted with this kind of door.

There is an attractive garage in the rear of the house. It is stucco and harmonizes in architectural lines with the house, making a very satisfactory building group. The garage is large enough to hold two cars and is equipped with sliding and folding doors, that is, a combination door made up of several panels which fold up and slide toward one wall very much in the same fashion as the casement windows in use on the sun parlor of the house.

Running Comment

NOW that we have a Fire Prevention Week, Thrift Week, Housecleaning Week, that's the matter with having a *Building Year*.



THE man who knowingly builds a firetrap is the sort of man who will trust a pin instead of suspenders. In case of an emergency most anything is likely to happen.



BETTER to have the house too small one day in the year than too large the rest of the time.



IT seems to us that the Kaiser would have a much easier time if he bought himself one of the new style saw rigs. Carpenters have found they "saw wood" without taking any time out for rest.

FUNNY how we change our ideas. Now we are eating strawberries in November. Soon it will be an all year round fruit. They used to stop building when it got cold, but now it is becoming an all year business. Only bears sleep during the winter.



NOW that the nations have gotten together to talk eternal peace and disarmament, would it not be a good idea to get landlords and tenants together in a friendly meeting and have them agree to some reasonable arrangement. More home owners and fewer tenants would remedy this situation.



A SOFT job is just about as hard to get these days as a hard drink. The builders who are up-and-at-'em are getting the business regardless of conditions elsewhere.

Lighting the Living Room

SECOND OF SERIES OF ARTICLES ON ROOMS IN THE HOUSE DEALING WITH SIZE, ARRANGEMENT, DECORATION AND LIGHTING

By Grace T. Hadley

Society for Electrical Development, Inc.

IT HAS been stated by a well-known illuminating engineer that the home is the theater of life. Like the stage, the home is a place of various moods and occasions and the lighting should be made sufficiently flexible to be adaptable to the various activities, moods and social affairs that take place. Activities in a living room vary from those of restful, quiet occasions to those of a joyous nature when company gathers as for a Thanksgiving dinner or a Christmas celebration.

The provision for only one lighting effect as in the case of the old-time parlor limits the possibilities of lighting and makes for monotony. Today there is such a variety in fixtures and different effects to be obtained, that it should be the aim in planning the wiring to keep these effects in mind in order that the lighting may do its share toward providing for the various moods and occasions in the home.

Most living rooms have a central fixture and in case of larger rooms there may be two as in the living room illustrated. This shows a large room lighted by luminous bowl fixtures containing silver mirrored reflectors. A flood of light or a well-lighted room is desira-

ble when there is some social activity as a musical evening to which guests are bidden, but this does not occur every evening. There are many quiet evenings when reading and study are in order, so wall brackets and portable lamps are useful. Soft lighting from wall brackets or electric candle-lamps on the mantel is often desirable for twilight illumination when folks like to sit and chat.

Decorative lamps have found their way into homes very extensively within the last few years. Many of them are heavily shaded and the illumination they give is purely local, most of the light intensity striking the top of the table on which they stand.

There is an exception to the general run of lamps in a certain art lamp that is equipped with a special adapter concealed within its silken shade. In appearance it resembles the usual art lamp but a little study of what lies within the shade shows that it has a small disc supporting several small lamps and an open frame supporting a large electric lamp backed by a mirrored reflector. Two chains are used to operate the lamp—the one chain lights the small lamps which throw their light downward upon the table top while the other



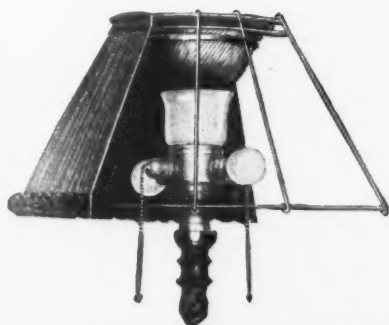
Luminous Bowl Fixtures Flood This Living Room with Light for Social Occasions. On Quiet Evenings Wall Brackets and Portable Lamps Serve the Purpose. Soft Lighting Is Desirable When Folks Like to Sit and Chat.

chain lights the big lamp which throws its light upward to the ceiling. If the ceiling is white or ivory tinted, a good general diffusion is thus secured.

Another type of center fixture suitable for a living room is a "direct-indirect" fixture from which a portion of the light is reflected to the ceiling by a metal reflector while some of the light escapes downward to be diffused by an opal glass plate. The fixture may be covered by a light silk shade to match the draperies also the small diffusing disc, thus making it possible to obtain a charming tinted light.

In living rooms where no center fixture is used wall brackets and portable lamps play an important part in the scheme of illumination. The lamps are mobile, as many may be lighted as necessary, the number of lighting effects increases with the number of lamps and circuits and the lamps are often part of the decorative furnishings. It is now within future possibility that the wall brackets and center fixtures will also be made "mobile" in the same sense that the portable lamps are "mobile."

It is said that places for lights will be made numerous in all new buildings so that brackets and fixtures can be connected or disconnected as easily as portable lamps. This will make possible a greater variety of lighting effects in the home. Fixtures will no longer be "fixed" as they have been, defying all change in fashions and the march of the years. If



Type of Floor Lamp with Small Lights and Larger Light with Mirrored Reflector. This Arrangement Throws Light in Both Directions.

new fixtures are desired when the house is redecorated or done over it will be possible for the householder to purchase them and plug them into these receptacles without the aid of expert assistance.

Thus with an adequate supply of receptacles and brackets and portable lamps the householder will be able to obtain a range of lighting effects undreamed of by his forbears. It is deplorable that there is such a scarcity of convenient outlets in residences when they contribute so much to the comfort and joy of home life at comparatively small cost. Here is an important point to be noted by builders and contractors—a small living room should have at least three "convenience outlets" and a room 14 feet by 24 feet should have at least six to make ample provision for the various activities of family life in the living room—these in addition to the center ceiling outlet and wall bracket outlets.

Electrical lighting effects have come to play a useful part in the decorative scheme of living rooms during the various festivities of the year. During the Thanks-



Handy Type of Wall Bracket Which Can Be Put in Place Quickly Provided Small Outlets Have Been Placed in Wall by Contractor. A Small Room Should Have at Least Three of These Convenience Outlets.

giving festival it is customary to decorate the room with autumn leaves and berries, also with jack-o'-lanterns lighted by small electric lamps. It should be a simple matter for the householder to connect these lighting outfits to a convenience outlet.

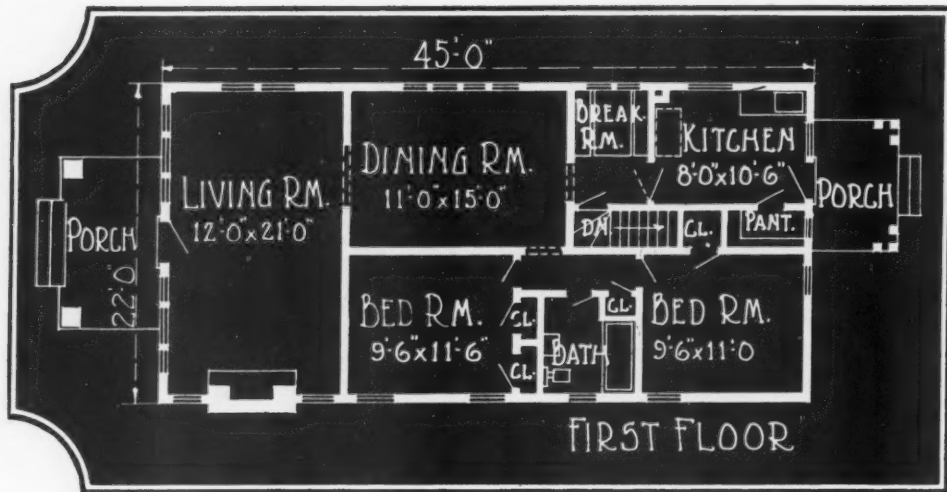
During the Christmas holidays electrically lighted Christmas trees play an important part in the celebration and there should be a convenient place for the tree and a convenience outlet which could be utilized for the lighting outfit. Too often these lighting outfits have to be connected to a center fixture on account of the scarcity of outlets in the living room. Electric lighting outfits are more and more varied each year and they demand a definite place for their attachment other than the center fixture. These lighting outfits consisting as they do of pine-cone lamps or Santa Claus fixtures add much to the beauty of the tree, not to mention the safety and happiness of the children.



Building Prospects in Chicago

BUILDING permit figures in Chicago for August, 1921, are more than those for a like period in the last seven years. The estimated valuation is over \$13,000,000, which is more than double the valuation for August, 1920.

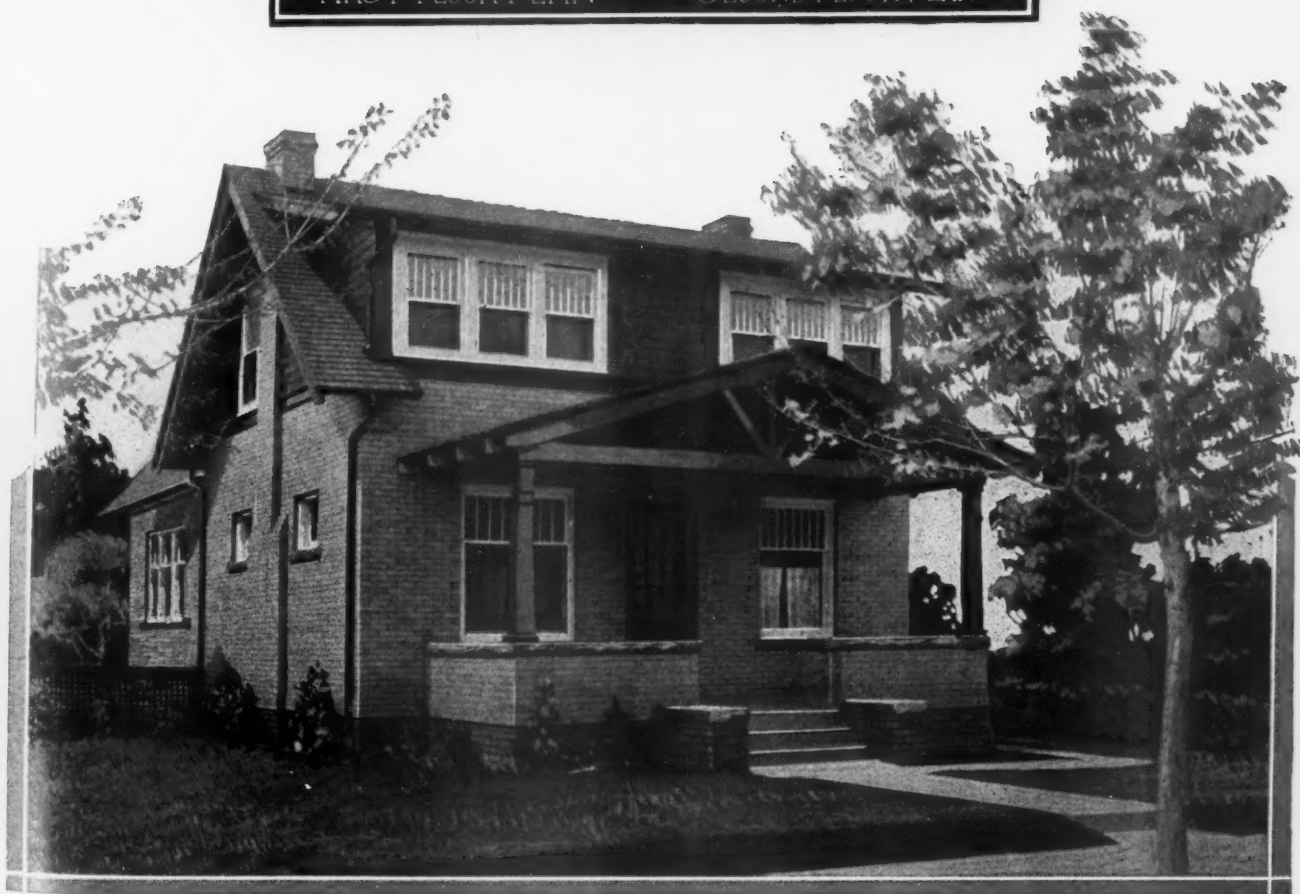
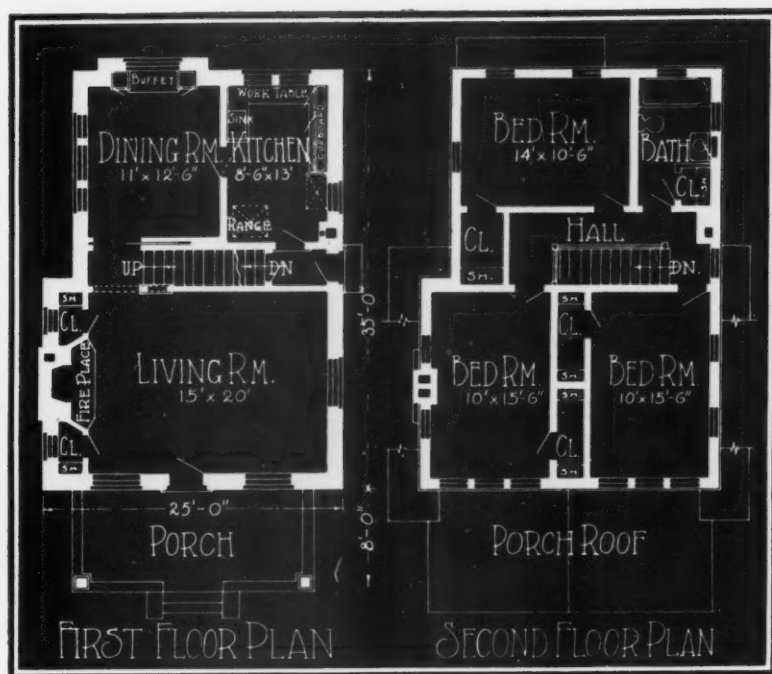
Of 1,051 permits, 656 were for residences and 195 for apartments. In July, 1921, 754 permits were issued, of which 510 were for residences and 124 for apartments.



DELIGHTFUL WESTERN BUNGALOW HOME. Like a breath of freshness, this charming little home offers its appeal to the homeseeker. Always individualistic in design, the bungalow presents a cozy impression that takes hold upon the hearts of men. Here we have an excellent home design, exterior artistically handled and interior well-proportioned and arranged. Its general lines, low, rakish, and rambling, enhance the general feeling of hominess. A glance inside reveals a large living room 12 by 21 feet with fireplace, enlivened by at least a half dozen windows. At one side of the rear is the doorway to the dining room, not oversize, yet ample for the needs of a family, and to the rear of this room is the hall opening into a side breakfast nook and the kitchen. The rooms have been snugly packed into the floor plan at a great saving in space. On the opposite side of the house are two bedrooms and bath off a small hall which opens into the dining room. This bungalow is 22 by 45 feet.

BLUE RIBBON HOMES

PRACTICAL
&
ARTISTIC



S SMALL, SUBSTANTIAL HOME OF SIMPLE, PLEASING DESIGN. Prospective home builders are on the lookout for small homes that are at the same time comfortable and economical. The home shown above possesses these qualities. It is simple in design, of brick construction with an open inviting front porch and attractive brick balustrades. The interior arrangement is particularly efficient, consisting of six rooms, three on each floor. The living room is generous in size, 15 by 20 feet, extending the full width of the house and has an open brick fireplace in the left wall with small flanking windows. Two windows facing the porch and another on the opposite side provide ample light. A short hall connects living room with dining room and also leads to the stairway to the upper floor. The dining room and kitchen are located in the rear of the first floor. On the second floor are three good sized bedrooms and bath. Each bedroom is splendidly lighted by windows on two sides. The house is 25 feet wide and 35 feet long.

House Construction Details in Concrete

FIRST OF SERIES OF ARTICLES DEALING WITH IMPORTANT PHASES OF BUILDING PROGRAM

By A. J. R. Curtis

I—CONCRETE STEPS

AT the beginning of a series of articles on house construction details in concrete, one would naturally expect to find something about foundations, for regardless of what materials may be used in the upper walls, either "poured" concrete or concrete block is used for the walls below grade in at least 98 per cent of the new houses. However, the subject of concrete foundations was treated in so much detail in the January number of the AMERICAN BUILDER that the writer will pass over it for the present. Readers who desire specific information about concrete foundations are invited to send their inquiries to the editor for reply in the question and answer column.

Some Requirements of Good Steps

Exterior steps constitute one of the most important of house details. In most houses all of the traffic passing in and out of the house must use the steps. So the steps must be substantial, easy to ascend and descend and as free as possible from upkeep expense. The treads must present level surfaces sufficiently rough to prevent slipping—for above all other considerations, the steps must be safe. Exterior steps are quite often located where they cannot be seen at night—an additional reason for extreme care in making them level and foot-sure. Step accidents are dangerous and one cause for which there is no valid excuse is variation in width of tread or height of riser. All of the steps in the same flight should be alike. If the flight has wind-

ing steps, the average width of these should be the same as the width of the straight steps.

Steps should always be built so that they can easily be kept clean. Exterior portions of city dwellings always require a great effort to clean and every contrivance to decrease this effort meets with the hearty approval of the housewife. In most buildings appear-

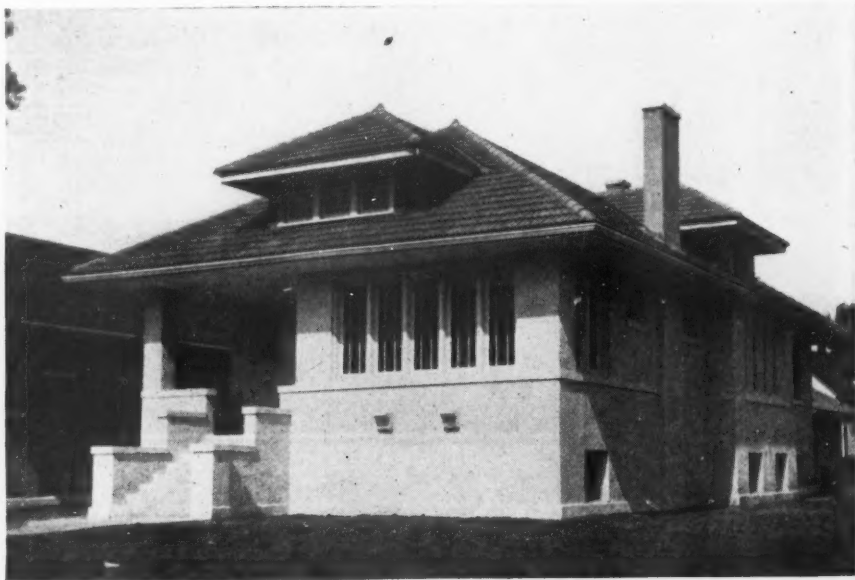


Fig. 2. The Steps of This Little Bungalow Are Safe, as Substantial and Trim in Appearance as the House and Free from Upkeep. Every Good House Deserves Good Steps.

ance counts for a little at least, so the exterior steps should be attractive—not necessarily ornate—but sufficiently good looking to add rather than detract from the general appearance of the building. Concrete steps, properly constructed, fill the bill in a vast majority of cases and for that reason are used almost universally where first class construction is desired.

Proportions for Exterior Steps

It is a generally accepted rule that the height of two risers, plus the width of one tread, should equal 24 inches.

The risers should seldom, if ever, measure more than $7\frac{1}{2}$ inches from tread to tread and the ascent is easier if this distance is decreased to 7 inches or even to 6 inches. Six-inch risers are better looking and are used commonly in the front entrances—where the lower riser gives the steps something of a formal appearance. There is an equally good reason to make service steps equally easy, particularly if heavy or bulky loads are moved up or down frequently. The tread width may vary from 9 to $12\frac{1}{2}$

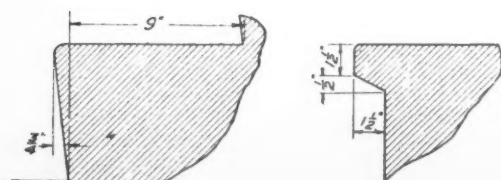
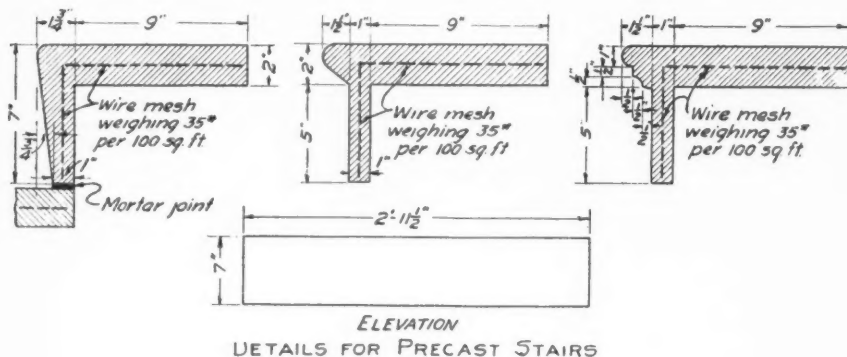


Fig. 1. Details for Concrete Steps, Precast and Cast in Place. The Plain Shapes Are More Practical and Less Liable to Injury.

inches. The steps shown in Figure 3 have 6-inch rise and 12-inch width of tread, representing good residence practice. Somewhat steeper but admittedly practical concrete steps in some modern concrete dwellings have a rise of 7 inches and a width of tread of 11 inches. About the steepest proportions recommended for concrete steps will be seen in Figures 4 and 5, where the rise is $7\frac{1}{2}$ inches and the width 10 inches.

Overhang on the treads is not of prime importance except where the flight is somewhat steep. Concrete steps are usually made with all angles square, but both the concave and convex corners are rounded to one-half inch radius to avoid sharp edges and leave no place for dirt to collect. If it

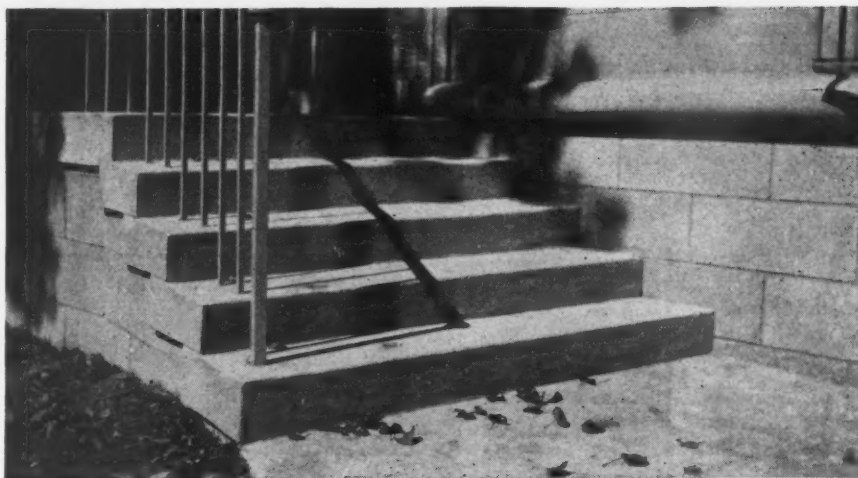


Fig. 3. Simple and Attractive Concrete Steps at Front Entrance of Suburban Residence. Height of Risers 6 Inches, Width of Tread 12 Inches. They Are Easy to Ascend and Descend, Have no Exposed Overhanging Portions, Are Safe and Easily Kept Clean.

with 1 inch of rich cement mortar made with about one part cement to two parts rather coarse sand or granite screenings. After being brought to a true level with strike board and float, the desired surface finish may be obtained by troweling just sufficiently for proper drainage, then corrugating as desired with a stubby broom. Avoid overtroweling, which produces slippery surfaces and invites hair checking and dusting. As soon as the concrete can be sprinkled without injury it should be moistened and it should be kept damp thereafter for four or five days. This curing process is important and should not be omitted if a good substantial job, free from dusting, is desired.



Fig. 4. Practical Flight of Concrete Steps for a Dwelling of Moderate Size. The Height of Riser Is $7\frac{1}{2}$ Inches and the Width of Tread Is 10 Inches. Detail for These Steps and Attached Floor Slab Is Shown in Fig. 5.

is desired to give the tread an overhang, this may best be done as shown in the extreme left of Figure 1, producing pitched risers so as to obtain a very strong nose on the tread. The overhang may be extended out on the tread, letting the riser remain vertical, as also shown in Figure 1, but while very attractive such overhangs are obviously weaker than the body of the tread and their exposed position makes them liable to injury. Special protection such as covering with boards until three or four weeks old is very desirable. The overhang should extend $1\frac{1}{4}$ inches beyond the riser.

Mixture and Methods of Placing

The body of the concrete should be of 1:2:4 mixture of cement, sand and pebbles and the surfaces which are to be exposed should be covered

easily obtained by the use of from 2 to 8 pounds of yellow oxide of iron to the sack of cement for the yellow and buff shades or red oxide of iron for pink and red.

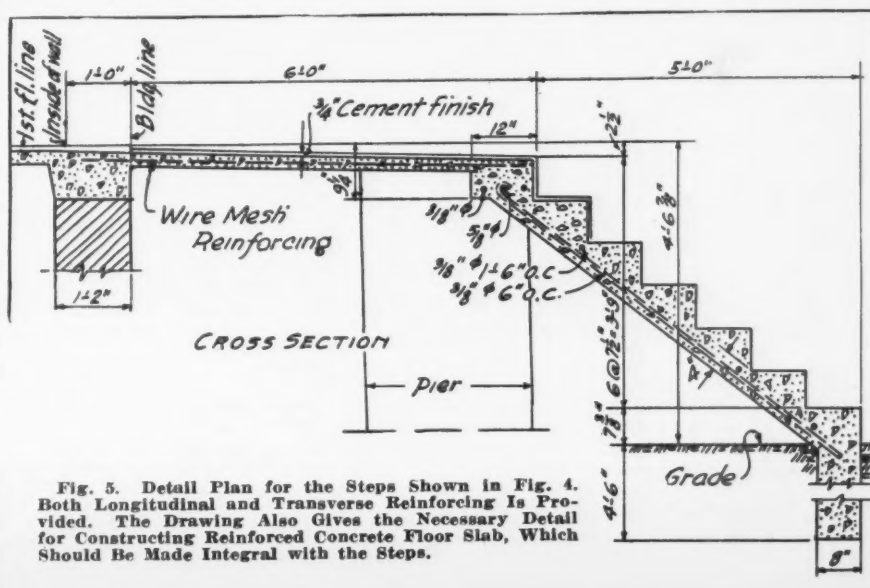
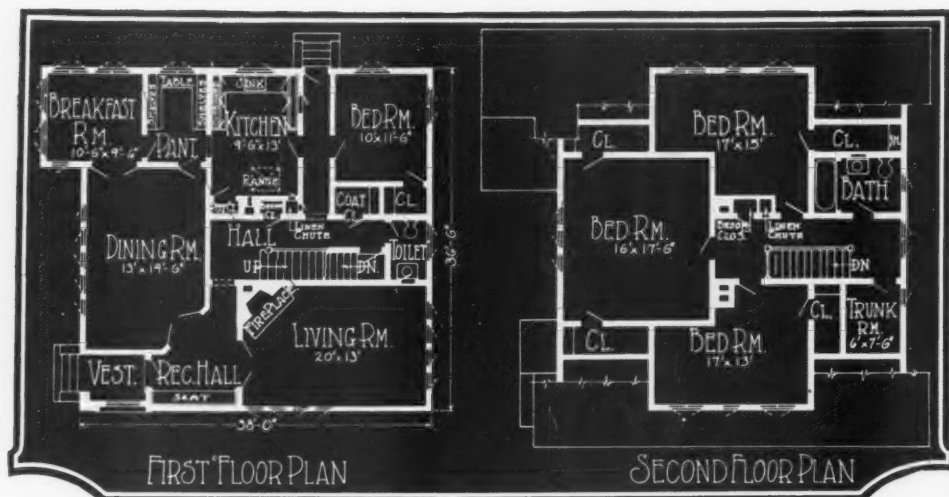


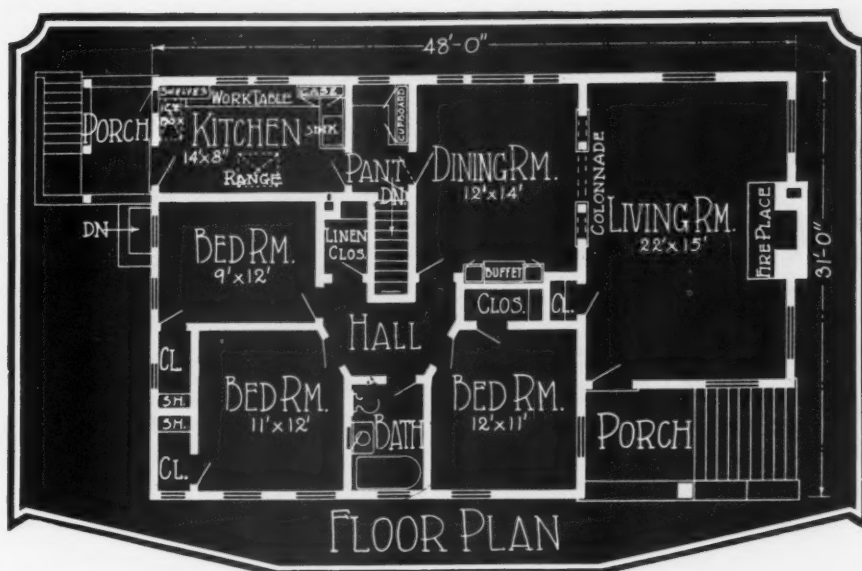
Fig. 5. Detail Plan for the Steps Shown in Fig. 4. Both Longitudinal and Transverse Reinforcing Is Provided. The Drawing Also Gives the Necessary Detail for Constructing Reinforced Concrete Floor Slab, Which Should Be Made Integral with the Steps.

BLUE RIBBON HOMES

PRACTICAL & ARTISTIC



SOMETHING QUITE DIFFERENT AND INVITING. Here we have a charming combination of the old and the new in the thatched roof of the modern home. Of course the roof is not really made of straw thatch but of real shingles made to resemble that effect and decidedly more serviceable. This home certainly presents an alluring picture, set snugly and closely to the ground. There are seven rooms, four on the first floor and three upstairs. On the first floor is a large living room with fireplace in keeping with the spirit of hospitality which the house personifies, dining room, diagonally across the small reception hall, and breakfast room to the rear of the dining room. The kitchen is reached from the latter room thru the pantry. One small bedroom for the maid is provided on the first floor. The other bedrooms are above, also a trunk storage room. Size, 38 by 36 feet 6 inches.



THIS UNUSUAL BUNGALOW DESIGN WILL APPEAL. You will find that among your clients there is a wide variety of tastes and ideas of homes. That is why an unusually odd design of this type will attract the attention of many people. Certainly it is different and in its way attractive. It is substantially built, frame with stucco coating above the basement line. The main approach is brick, leading to a small recessed front porch with door on the side of the house. The wide double hung windows are striking with full lower pane and divided upper sash, and the irregular somewhat flat roof is quite odd. Inside there are six sensible rooms, the living room taking up the entire space across the front of the house with fireplace in center of the front wall, as indicated by the large outside flue. Note the complete equipment in the kitchen. This house is 31 by 48 feet.

Law For The Builder

LIABILITY OF BUILDING CONTRACTOR FOR DAMAGE TO WORK CAUSED BY FREEZING

By Leslie Childs

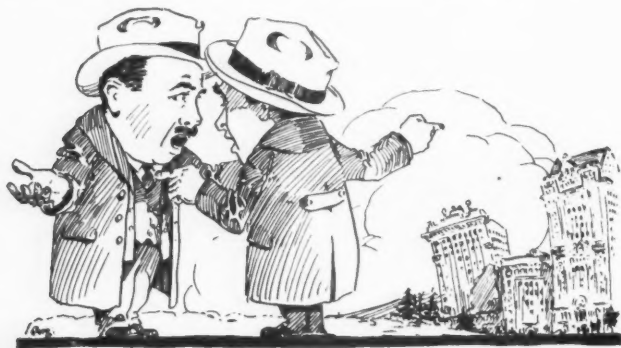
IN the conduct of building operations in the winter months, especially where masonry or brick work is being done, the question of protecting such work from freezing is at times of considerable importance. If then the work is not properly protected and injury results, a situation is created which may be the cause of some difficulty.

This then raises the question of how far the contractor is bound to go in the matter of protecting such work. And, generally speaking, where the contractor undertakes to do work in cold weather it is his duty to protect it, and if injury results from lack of protection he must bear it.

The application of this rule of law is illustrated in several cases among them being *Brent vs. Head, Westervelt Company*, an Iowa case reported in 115 N. W. 1106. The facts involved, in so far as they are material to this discussion, being as follows:

The contractor agreed to erect three buildings and to have them completed by the 20th day of December. Owing to various causes the work was not completed until many months later. A dispute arose relative to payment, which involved a claim that the buildings were materially defective. The contractor in reply to this claimed, among other things, that the defects complained of were due to the season of construction and the settling of the foundation, contending that he should not be held liable for this. The cause reached the Iowa Supreme Court, and in disposing of this contention it was, in part, said:

"The plaintiff (contractor) undertook to erect the buildings at that particular season, and to do a first class job. There was no provision in the contract whereby he was relieved from protecting his work or material from the effects of freezing weather, and he cannot now claim that he should be released from liability because thereof. The evidence conclusively shows that buildings may be safely erected at any season of the year if proper steps are taken to protect the material and construction work; and that such is the case is matter of almost common knowledge. . . ."



"The Contractor Claimed That the Defects Were Due to the Season and the Settling of the Foundation."

The court, as outlined above, declined to permit the contractor to excuse the defective work on the ground that it was caused by freezing. Holding that, in the light of the circumstances and contract, it was his duty to properly protect the work when he had undertaken to perform same during freezing weather.

The foregoing decision without doubt announces the true rule of liability, in cases where the contractor is not protected by provisions in his contract, and assumes to perform work during cold weather in his own responsibility. However, the contractor's liability for injury to work may be modified or entirely changed where it is shown that he performed the work only upon the directions of the owner. This phase of the question is illustrated by the decision in *Schliess vs. Grand Rapids*, 131 Mich. 52, 92 N. W. 700, which involved the following facts:

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The contractor thereupon started work and completed the job on April 5, and it was thereafter discovered that some of the mortar had been killed by freezing, and a portion of the work had to be taken down and rebuilt. Thereafter the instant suit grew out of the dispute as to who should stand this loss.

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(Continued to page 71.)

Architectural Use of Concrete Stone

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By Leslie H. Allen

THE growing use of concrete stone in architectural design brings before the architect new problems in the use of new materials.

It is a truism that the use of every material calls for a technique of its own, but it usually happens that the use of new material is handled at first in the traditions of materials already in vogue. This tendency to imitate stone has been seen in all times. It is commonly thought that the Greek builders imitated the trunks of trees in the Doric column and the flutings are supposed to be a conventionalized copy of the bark on the tree trunk. Tryglyphs and guttae are likewise

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The accompanying illustrations give some idea of the possibilities of concrete stone. The Chapin Bank at Springfield, Mass., is a good example of monumental design in a concrete stone resembling granite. The Vancouver job shows some excellent trimstone in a region where transportation costs put other material out of the question.

No architect likes to imitate a good material with a cheaper one and the use of concrete as in imitation is to be condemned. When an architect desires to obtain a certain architectural effect he is justified in using the material best suited to produce that effect, bearing in mind

the availability of local material and the funds at his disposal. Many a man who would like to design a granite building has to design in limestone, terra cotta or brick because there are not sufficient funds available or because transportation difficulties or other

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Concrete Stone Trim and Garden Balustrades in Residence of B. T. Rogers, Vancouver, B. C. Work by Dominion Construction Co.

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Notable work has been done by some of the higher grade producers of concrete block and trimstone in the production of concrete surfaces and concrete structures which have an individuality that puts this material in a class by itself. And because of its economy, architects are turning more and more to the use of concrete for all kinds of architectural ornament.

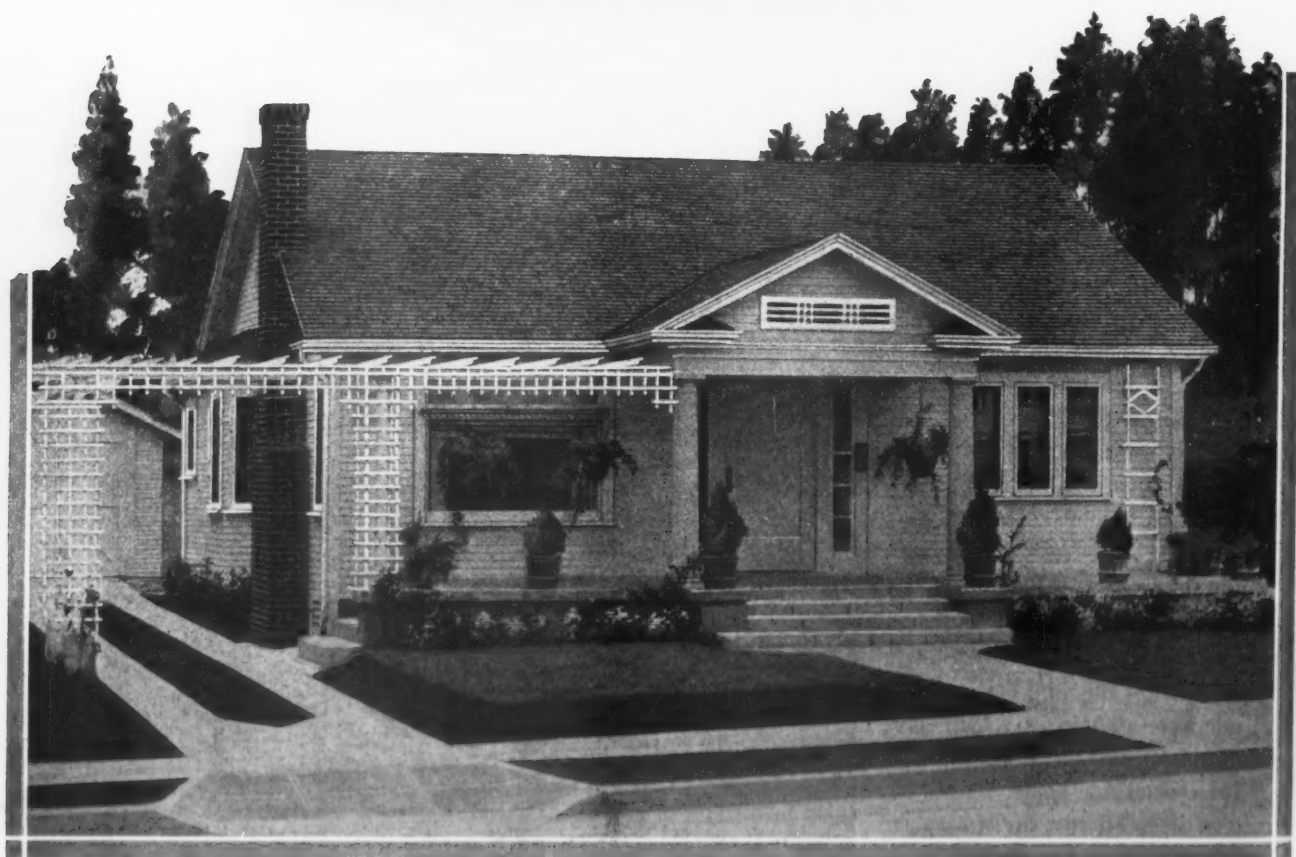
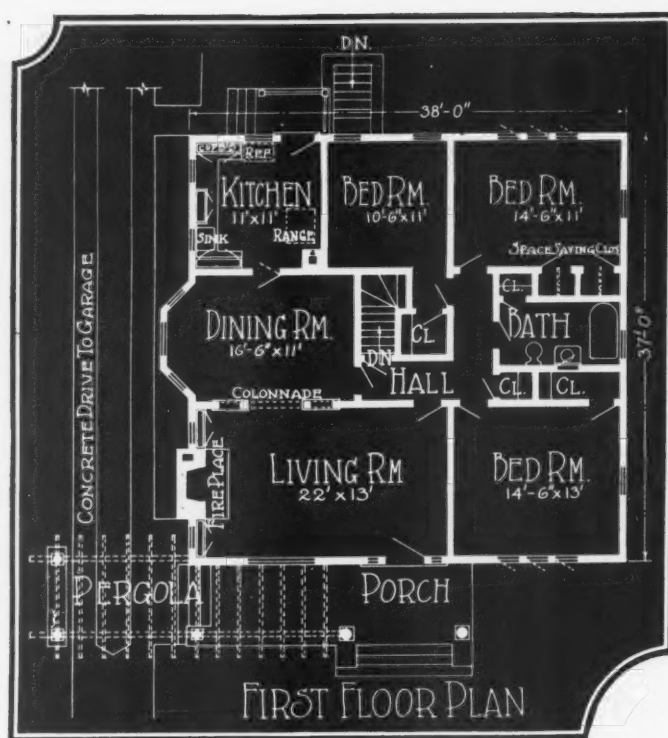
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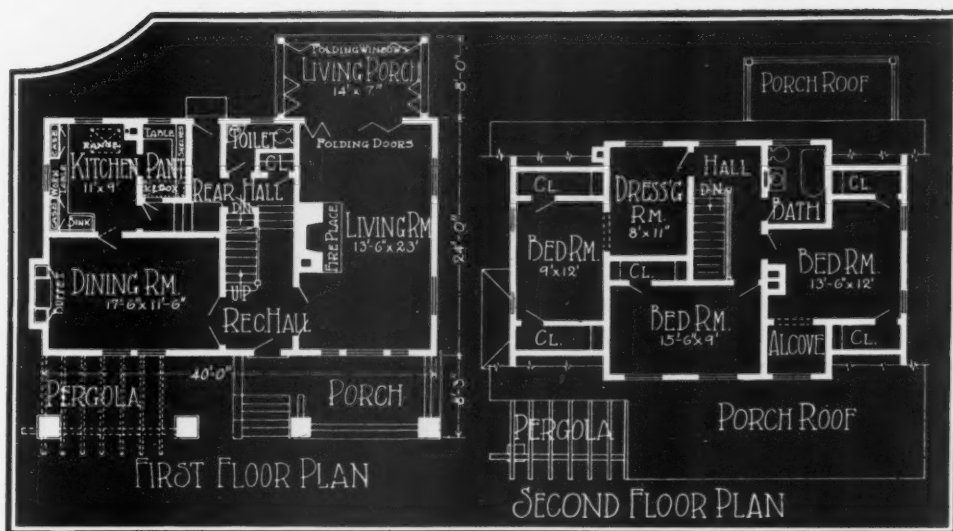
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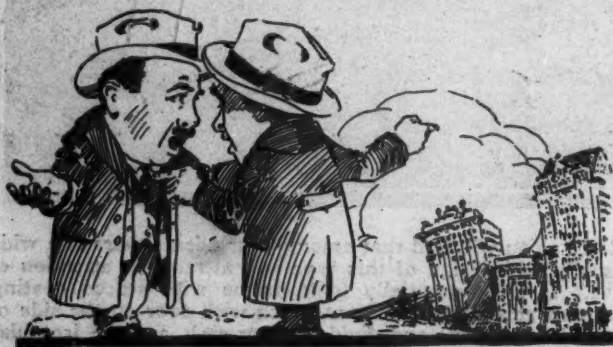
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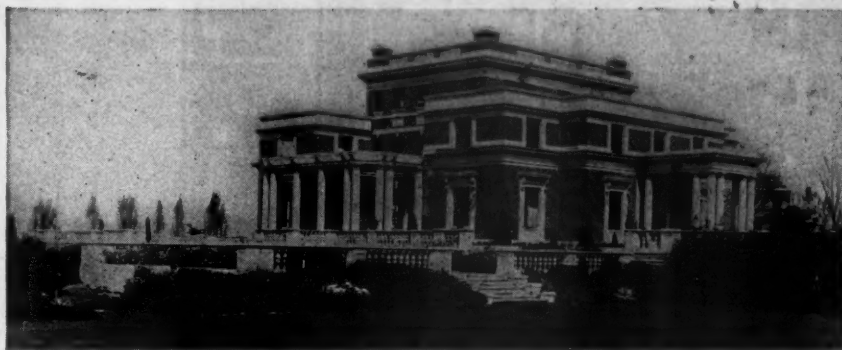
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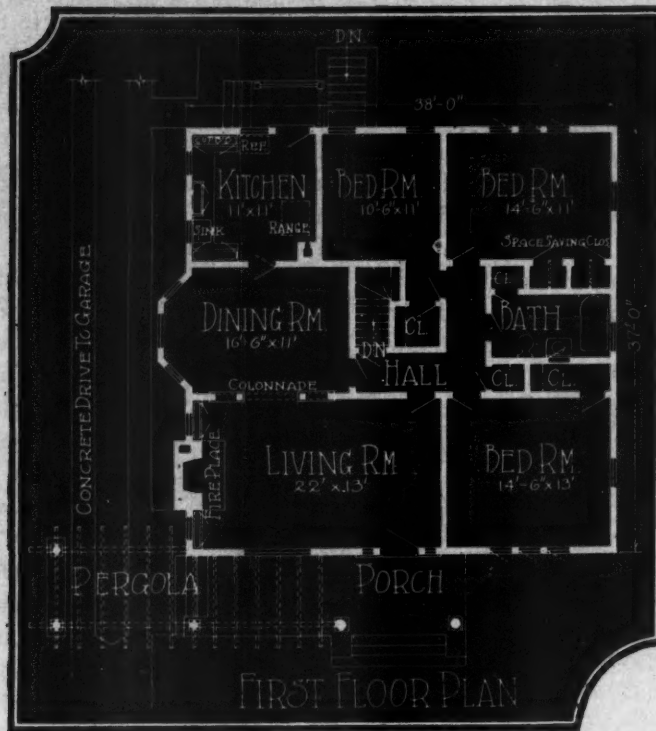
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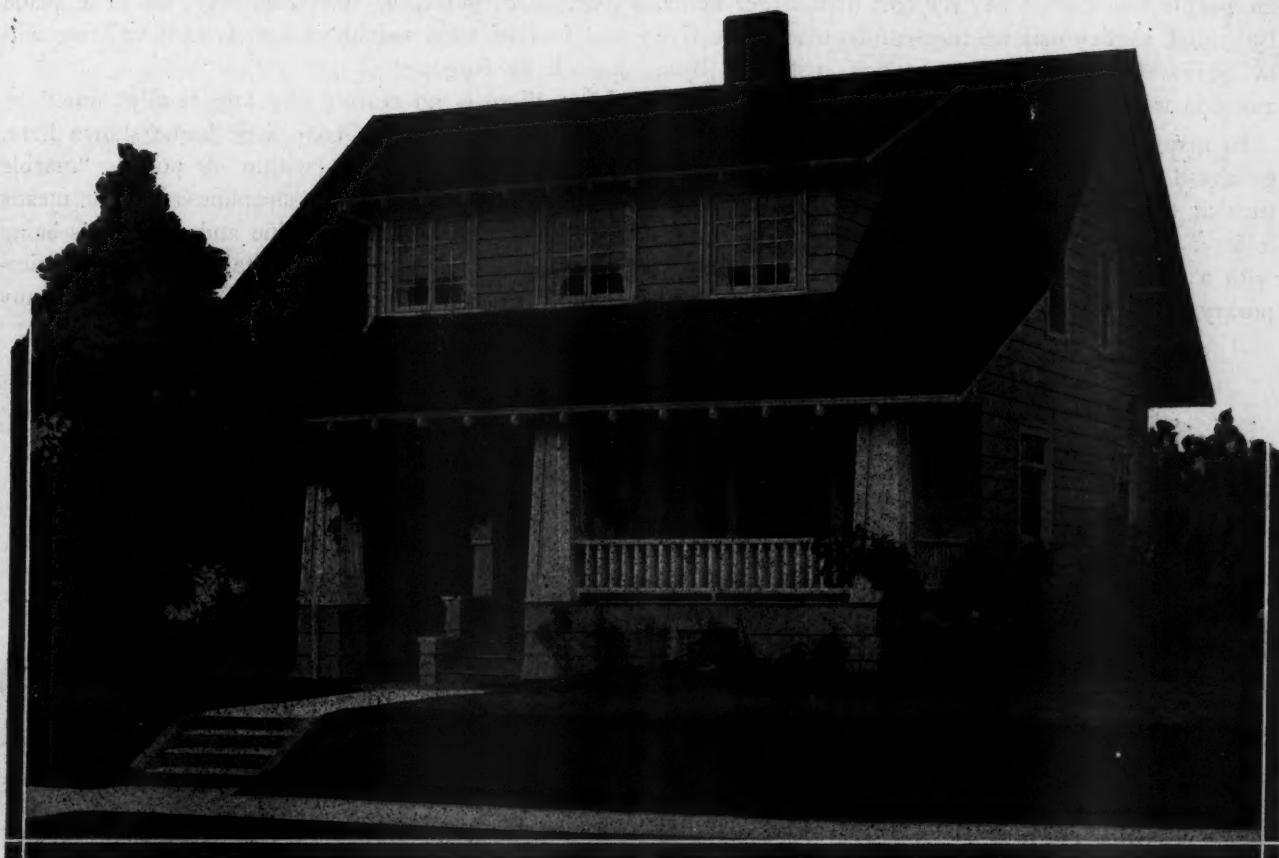
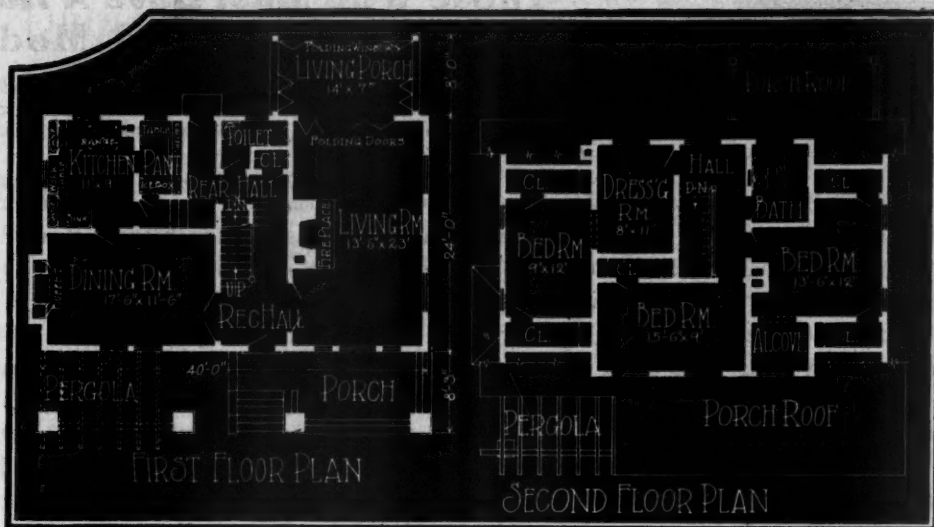
PRACTICAL
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"A Home for A That"

Two Pages of Suggestions for Those Who *Must Have A Home* However Small and Modest

Here is a very timely chance to do some good. No doubt some of our readers know of little homes like this built in an emergency and successfully lived in. Please write and tell us about them, and send a photo. It will help others.—The Editor.

HOME is home, be it ever so humble. We cannot dodge the centuries of evidence that the home is the be-all and end-all of our whole fabric of civilization and progress. Luxuries can be dispensed with, even necessities omitted if necessary, but the home must survive, tho it be but a shelter of the skins of animals as it was in the day of prehistoric man, the bark of trees or a cabin of logs. Regardless of its character, it is a home and as such serves a very vital purpose.

Today the small home, and, by that is meant the very small type, is satisfying a very definite want for the people who cannot pay the cost of a larger home. But, small as they may be, they can be made attractive by a few simple decorations which cost very little and add infinitely to the appearance.

In many cases the man has not enough money to go ahead with a big house so builds a smaller structure at the rear of his lot with the idea of using it for a garage when he is in a position to go ahead with a house that he has planned. That these temporary shelters are a stepping stone to genuine home

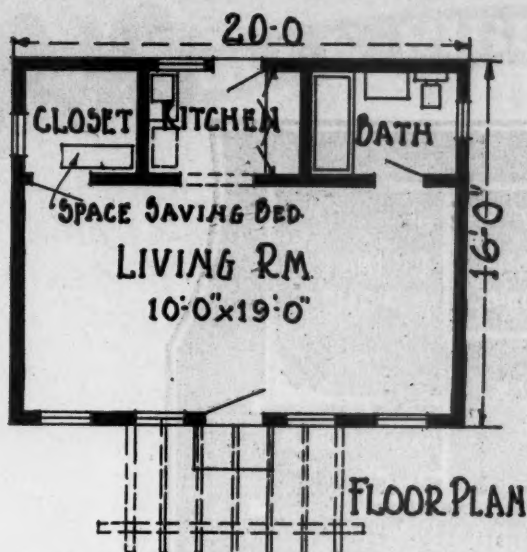
ownership has been demonstrated in more cases than one. There is this much about them that makes them worth while—they mark the first step to independence and get the man started.

There are a variety of ways of providing an adequate shelter for the family of meager means who simply cannot pay the rents that are being asked, and in this department the AMERICAN BUILDER will show from month to month designs that will perhaps be the inspiration of many such families who are facing such a situation. Better to have them in small homes than to increase the possibilities of their becoming bolshevists. Of course, to start this way, all false pride and fear of what neighbors and friends will say will have to be forgotten.

But there is no reason why any family should be ashamed to live in the cozy little home shown here. True enough, it has not within its portals "marble halls" or polished floors, but cleanliness is by no means restricted to any class or station and cleanliness being next to godliness is more important than ornate trimming. A small picture will drive bareness from any



A Small "Wee House" That Will Help Many Poor Families Become Independent and Escape the High Rents Until They Are in a Position to Build a Better Home. A Few Decorative Touches Have Disguised Some of the Crudities of Construction. This Home Contains Two Rooms and Bath.



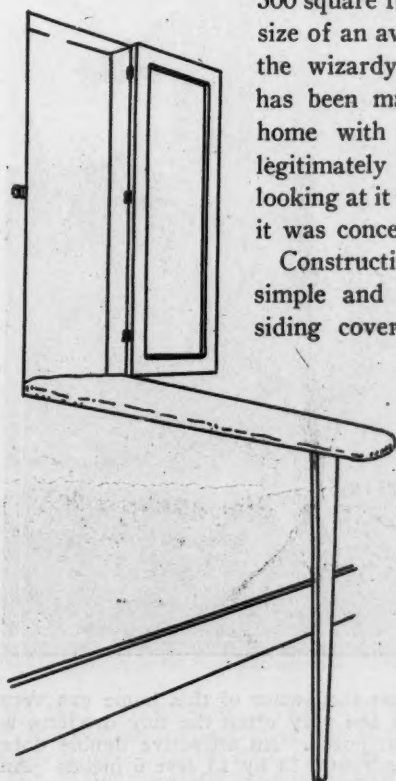
Floor Plan of Small House Shown on Opposite Page.

wall and a small trellis along the front of the dwelling where vines can twist their way will hide the defects of the most humble exterior and add a luster that only the brush of Mother Nature can conjure. Or perhaps a modest pergola over the front door will add a hospital touch that will cause visitors to overlook the cheapness of the building itself. We cannot disguise a cold heart by warm clothing, no more than we can hide a barren home by artificial decoration. It is the comfort within that makes the real home and is this little "wee house," as Burns would call it, can be the palace of many people.

Twenty by 16 feet! Just about 300 square feet of floor space, the size of an average garage, but by the wizardry of the architect it has been made into a complete home with which no one can legitimately criticize adversely, looking at it in the spirit in which it was conceived.

Construction thruout is very simple and inexpensive. Plain siding covers sheathing on the

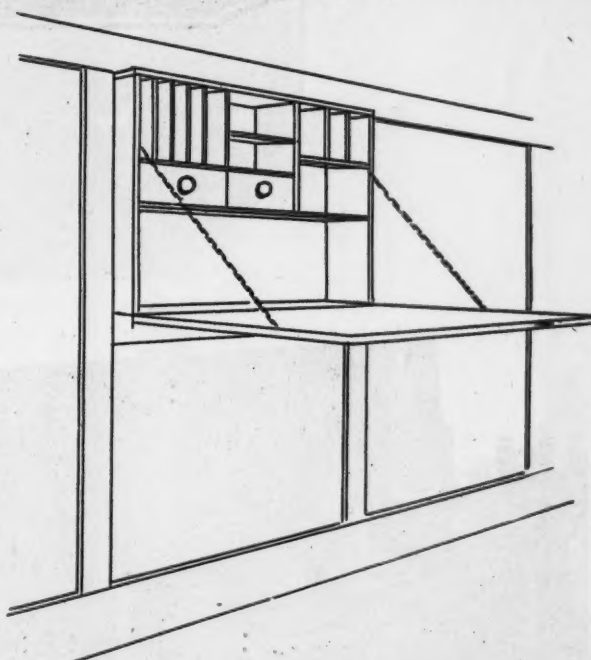
outside and wall-board panels take care of the inside walls. Because of the small load to be carried, posts serve as a foundation and no excavation for a cellar is needed. Two small steps mark the approach to the plain front door which has been made real inviting by the addition of some over-



An Ironing Board of This Type Can Be Built In at Small Expense.

hanging trellis work. The low roof is covered by prepared roofing and four half-length casement windows provide plenty of light for the interior. Everywhere is economy in use of material employed. And the result is pleasing.

This little home goes the "parlor, bedroom, and bath" arrangement one better for the bedroom has been taken care of in the large living room, 10 by 19 feet. At one corner is a concealed bed opening out into the living room from a dressing closet, just a small affair, but ample for the needs of the family who will occupy this home. The small kitchen is connected with the living room by an open doorway and contains all the equipment that can be found in a larger room in a larger home. There are cupboards for dishes, food, and utensils, and sink and

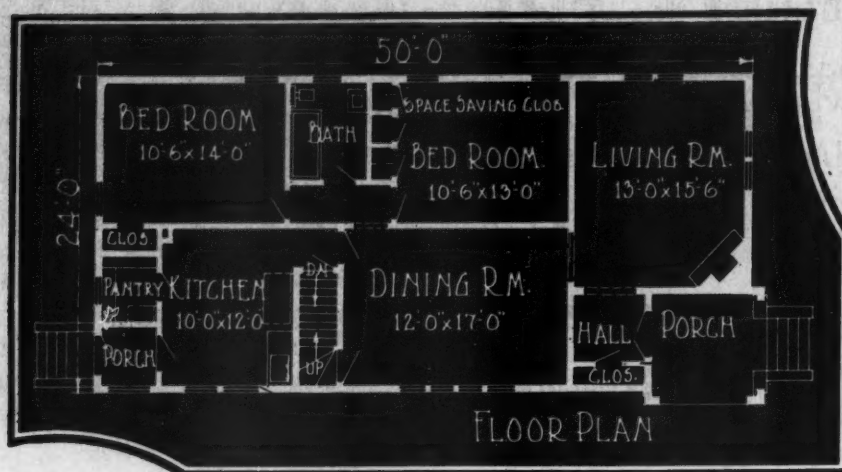


Suggestion for Built-In Writing Desk.

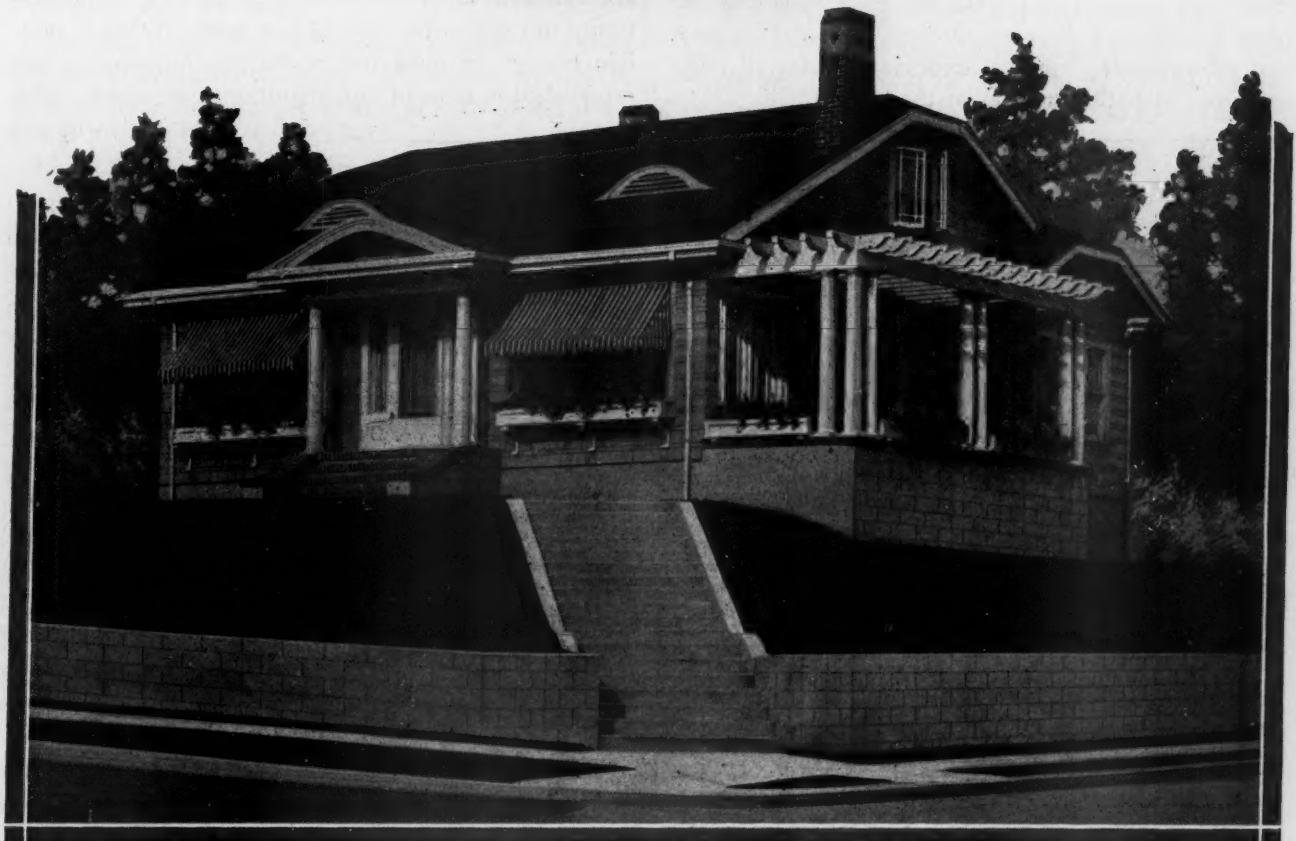
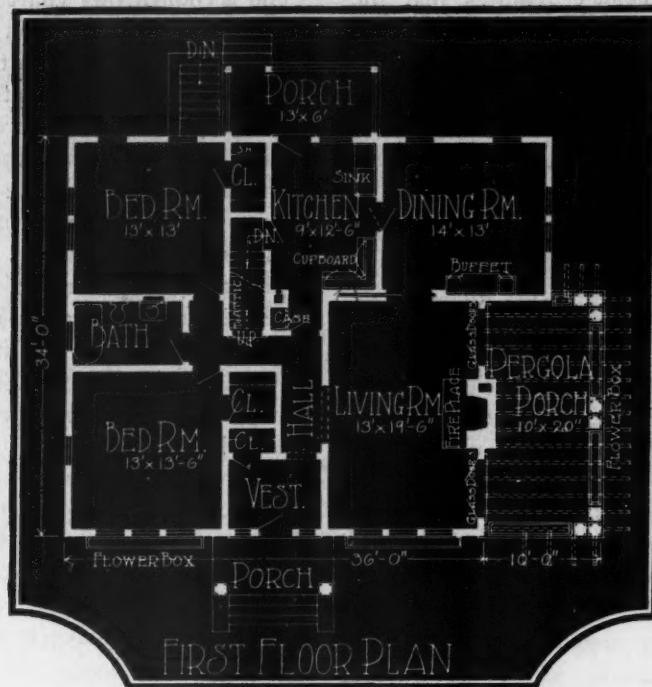
range. At the other corner of the house is the bathroom, modern in every respect.

Certainly not a bad arrangement and one that will find instant favor with many families who are anxious to own their own home, but do not possess sufficient funds for a regular one. Many additional comforts can be added to this type of home at very small expense. The sketches illustrate a few built-in features that will eliminate extra furniture and yet supply a very convenient need. Take the built-in writing desk. Quite simple—a home like this will more than likely be finished in wallboard because of its economy. A panel of this wallboard can be hinged as shown with two side check chains to hold it in position and serve as an impromptu writing desk.

Then again in the kitchen the housewife can very conveniently use an ironing board. Because of limited space, this device can be built in the wall.



"SMALL THO THOU ART, TO ME THOU ART A PALACE." That is what the owner of this home can very proudly say. Size and bulk do not determine the real character of a home and very often the tiny dwelling is the most comfortable of all. This home has a stucco exterior with recessed front porch. An attractive double door opens into a small vestibule which has a door at the right leading to the living room, 13 by 15 feet 6 inches. An open doorway leads from here into the dining room, which is of good size. Two bedrooms and a kitchen make up the balance of the house. A home like this, small as it is, will bring more real happiness and solid comfort to a small family than all of the luxuries of the world's treasure houses. Here the head of his house is independent, free from rent, leases, and other worries. "Children are allowed" and they have a yard to play in. Size, 24 by 50 feet.



HIGH TERRACE GIVES BUNGALOW COMMANDING APPEARANCE. Natural beauty of site greatly enhances the setting of this picturesque bungalow. It is set high above the walk with a long flight of concrete steps leading to front door. At one side facing the other street is the pergola roof porch. The main siding is shingles with a smooth-faced concrete block foundation. The surrounding garden wall is of the same material. Small touches such as the window flower boxes are effective in making a better impression. There are five rooms in this dwelling, of which two are bedrooms. The living room is built along generous lines with fireplace and flanking French doors opening out onto the side porch. Dining room and kitchen are small but sufficient and the bedrooms are quite comfortable. This floor plan arrangement will appeal to many small families. Size, 36 by 34 feet.

Cost Analysis for Concrete Products Plants

MAN IN BUSINESS MUST KNOW HIS COSTS ACCURATELY EVERY DAY IN ORDER TO MAKE MONEY

By R. J. Hoffman

THE first rule for solvency requires that the manufacturer's selling price for a product be above the cost of production. That is fundamental and accepted almost as uniformly as the law of gravity. But the difficulty usually occurs in determining what the cost of production is, and this is where several hundred business concerns, large and small, of one kind or another, go on the rocks every month. Let us put down as our first proposition:

$$\text{Selling Price} = \text{Total Cost} + \text{Profit}$$

How large or how small that item of profit should be is something which it is up to the individual manufacturer to determine for himself; but the other item included in the selling price, i. e., the total cost, must be minutely dissected in order to make sure that we really have the *total cost*, which must include every item of outlay to the business. Let us state, then, that

$$\text{Total Cost} = \text{Manufacturing Cost} + \text{Selling Cost} + \text{Financial Expense} + \text{General Expense}$$

Manufacturing cost divides up into *material*, *labor* and *overhead*. Selling cost includes *salesmen's expenses*, *salaries* and *commissions*, *advertising*, *dues in trade* and *protective associations*, etc. Financial expense covers *cash discount*, *interest*, *doubtful accounts* and *adjustments*. General expense includes all office expenses, including salaries of the office force.

The accompanying chart constitutes an analysis of cost items in the production and sale of concrete products. Altho the technic in the conduct of these plants and the range of products manufactured vary too much to permit of a more minute analysis without making definite assumptions and attempting to work them out for some definite class of plant, the accompanying chart will apply fundamentally to all concrete products plants.

The man who wants to stay in business long must know his costs accurately and know them every day. Every fluctuation in every item which goes to make up the total cost should be studied immediately with respect to its effect on the total cost. Without an accurate knowledge of total cost you cannot arrive at a just selling price and you may find yourself heading toward bankruptcy or getting into the class with the profiteers.



Architectural Use of Concrete Stone

(Continued from page 59.)

trade conditions make it difficult to get the material he wishes for. Concrete stone, the materials for which are available in every locality, offers him the opportunity to express his desires in a material that is flexible enough to meet his needs. Manufacturers are established in most of our important centers; men who specialize in this work and produce high quality.

In pre-cast concrete stone all impurities and foreign matter can be eliminated if due care is exercised in the selection of the aggregate and the face will always remain free from efflorescence or iron spots or other unsightly defects.

Manufacturers, realizing the big future for concrete stone, are each day improving in methods of manufacture and the grade of the product turned out. Where formerly manufacturers were shipping, as a finished product, the pre-cast stone as it came from the form, most of them are now casting the stone larger than the required finished size and then dressing them down, thus assuring good finished surfaces and sharp corners and a perfection of modeling in detail.

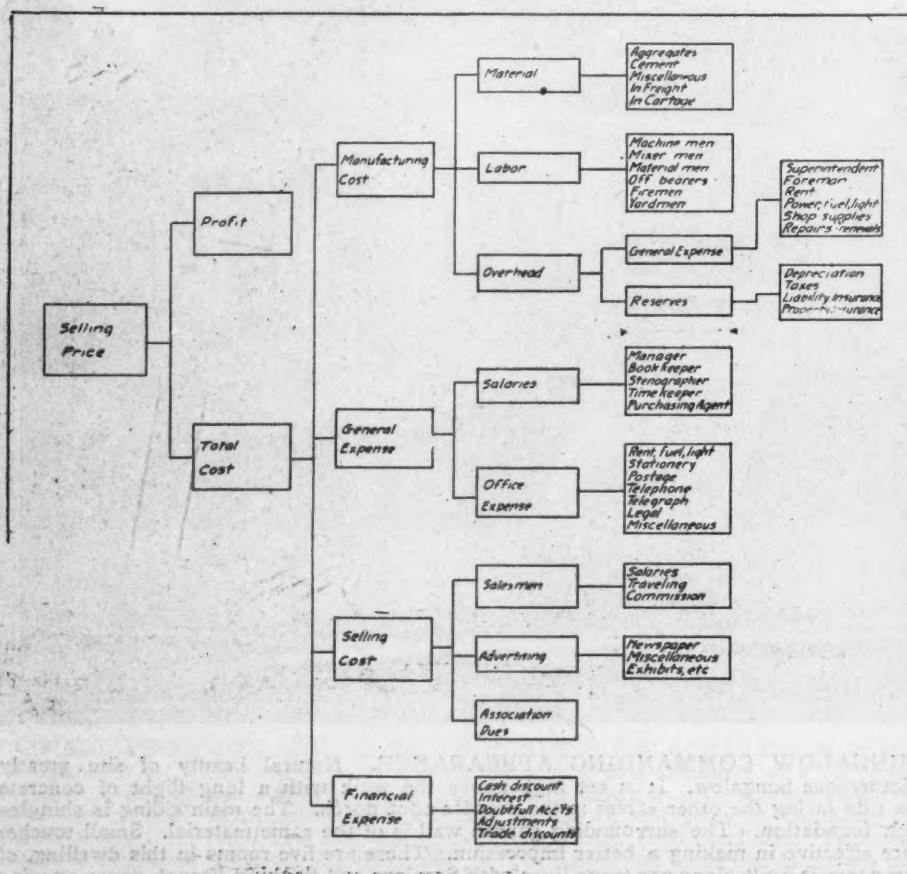


Chart Showing Analysis of Costs in Production and Sale of Concrete Products. It Shows in Detail Overhead Expenses and Other Costs, Which Should Be Figured to Determine Profits.

Practical Dutch Colonial House Design

SIMPLE DESIGN, PLEASING TO EYE, CAN BE BUILT WITH SAVING BECAUSE OF FREEDOM FROM USELESS ORNAMENT

PRACTICAL thruout is the house herewith illustrated. It is simple in design, yet pleasing to the eye, and is economical to build. No useless ornament has been applied.

The walls are of 4-inch studs, sheathed and shingled.

The broad overhanging eaves are not difficult to build and they add much to the appearance of the exterior. This overhang allows the broad dormer to be set on line with the wall below and yet have sufficient roof in front of the dormer to look well. The roof is shingled.

By staining the shingles before they are laid a wall or roof is insured against decay and a much better finish is obtained than when the shingles are allowed to weather without stain.

Interior partitions are of 4-inch studs and are lathed and plastered. The walls are finished hard white, some are tinted, others papered.

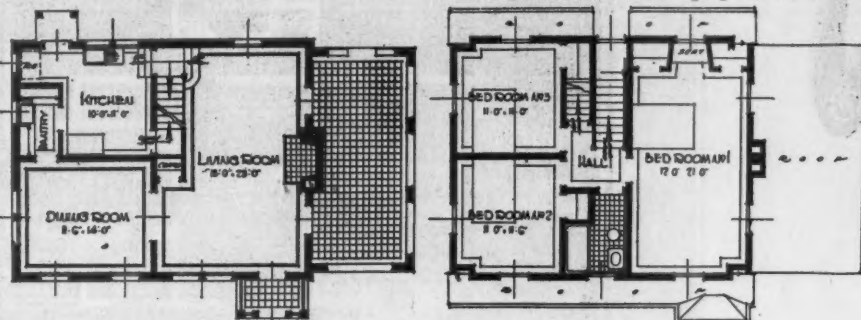
The interior finish is whitewood, enameled. Doors are birch, finished mahogany. Floors are of oak in the first floor rooms, yellow pine in second and third floors.

The plans show a convenient arrangement of rooms,

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The stairs go up from the living room, no stair hall being provided. This arrangement gives a large room that makes use of all space at all times. Steps are provided from the lower stair platform to the kitchen.

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First and Second Floor Plans of Practical Dutch Colonial Residence.

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Lumber Production in Germany

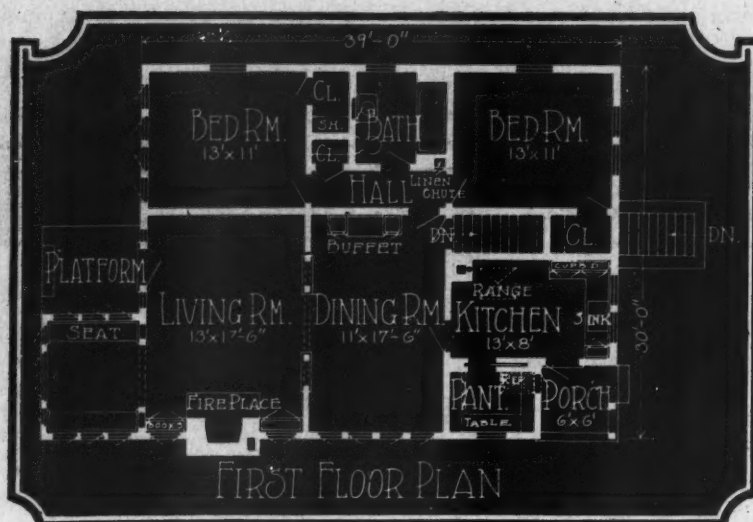
THE cut in German forests during the war was about 70 per cent of that during normal years. Germany is now one of the important European lumber exporting countries, due partly to price advantage gained by low rate of exchange on German marks.



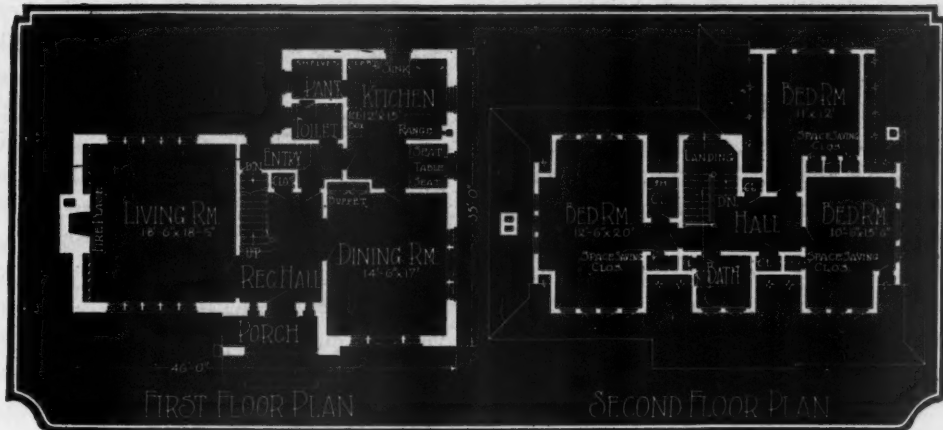
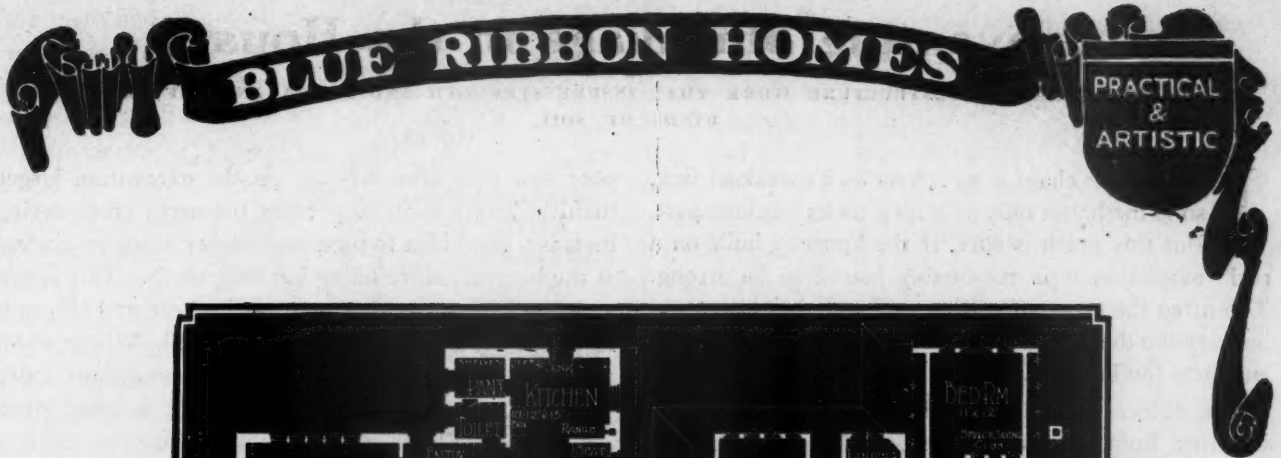
Well Designed Dutch Colonial Residence of Six Rooms. The Side Walls are 4-Inch Studs Sheathed and Shingled. Simplicity of Design Has Made This House Economical to Build. Owner, F. Halderman, Tenafly, N. J.; Architects, R. C. Hunter & Co., New York City.

PRACTICAL
&
ARTISTIC

BLUE RIBBON HOMES



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"SUNSHINE" HOME. Easily the outstanding feature of this beautiful compactly constructed house is the abundance of window space. Upstairs and down, each room has many windows, admitting plenty of health-giving sunlight. It is built of tile coated with stucco and a few added touches around the entrance in special texture brick. The roof presents a very pleasing appearance, made up as it is in the thatched effect with composition shingles. The large living room at one end is a veritable storehouse of cheer and brightness as a formidable row of French doors in front and walls make it a room of glass. A large fireplace is located in the side wall. There are three rooms on the lower floor and three above. While giving an impression of bigness this house is not extra large in size, being 46 feet wide and 35 feet deep.

Preventing Shrinkage in the House

BASIC PRINCIPLES OF SUBSTRUCTURE WORK THAT INSURE STRENGTH AND PERMANENCY OF DIFFERENT KINDS OF SOIL

JUST as the chain is as strong as its weakest link, so is the house only as strong as its weakest part. But this much is sure, if the house is built on a real foundation it is reasonably bound to be strong. Too often the cause of settlements and shrinkages can be traced to the imperfections of the substructure which supports the building.

The successful builder will not attempt to rear a beautiful home on an imperfect setting, knowing that within a short time his work of art will soon be cracking and twisting out of shape. The foundation of the home is the corner stone of its future life.

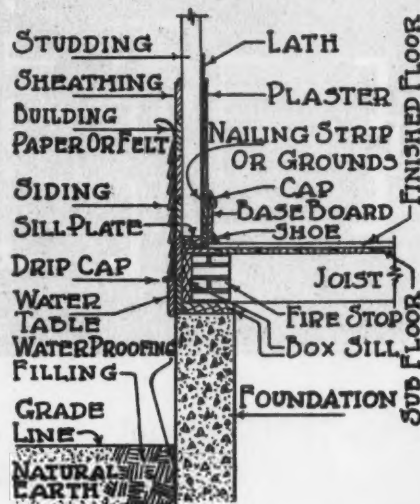
Once the idea of solidity and strength is gained the matter of material will come along easily. That is more or less a question of locality. In some sections stone is used almost entirely because it is easy and cheap to get. There are natural quarries close by which provide this material at little cost. Naturally it is the logical material to use. In other localities brick is popular and concrete is used practically everywhere because of its economy in cost.

In building a foundation the kind of soil is quite important and determines the necessity of special footings. If the soil is good clay, or gravel, or rocky and the house is small and not heavy, footings may be dispensed with entirely with a resulting saving in cost. The matter of footings can generally be determined before plans for the home are drawn, but often after the excavation is started a soft stratum of earth is struck which necessitates special treatment. When the excavation has been completed down to the proposed level it is advisable to make soil soundings all around for soft spots.

Footings are primarily the means of securing additional bearing upon the soil by a greater width at the base of the foundation wall. These footings are made in a variety of ways. In case the ground is

poor and it is necessary to dig the excavation larger than the exact walls to prevent the earth from caving in, it is a good idea to put some broken stone or cinders at the bottom before filling back the earth. This forms a channel for water that may get in there and allows it to escape rather than lie against the wall. Where water

conditions exist, it is good practice to place a terra cotta pipe or drain tile around the walls on the outside or inside below the top of the footing or the bottom courses of walls in which there are no footings. These drain pipes should be laid with open joints and graded to

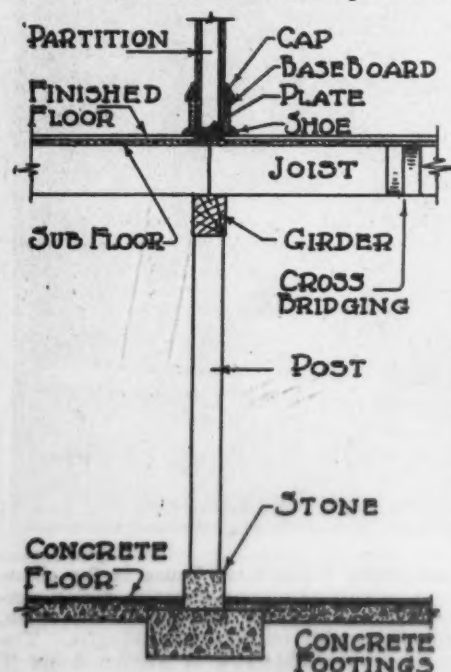


Wall Section at First Floor Line.

low points and then drained to the nearest point of disposal.

In many sections of the country cellars are omitted and the foundation consists of several separate piers (in the case of frame dwellings or solid walls). It is important to see that these piers and walls are built in proportion to chimneys so as to avoid any possibility of unequal settlement. In most cases the foundations

of the chimneys are better proportioned to the soil bearing capacity than the piers supporting the houses. As a result, the chimney has very often remained stationary while the weight of the



Post in Basement Supporting Floor and Partition.



Wall Section Thru Footings.

building caused the piers to settle, resulting in a badly cracked interior.

In frame dwellings with masonry foundations, the foundation is carried to the level of the bottom of the first story joists which are then set directly on the wall and notched over and spiked to a wood plate which is first placed on the wall and bedded in cement near the outside edge. The wood studs should be carried down

to the plate and be spiked to the joists wherever possible. This ties the exterior walls to the joists and avoids danger of any spreading of the building from the weight above. Whenever possible, wood in construction should

be laid on the end grain. Wood laid flat is subject to a shrinkage of sometimes three-quarters of an inch in a foot, while the shrinkage when laid on end is negligible.

There are several reasons for settlements in houses, one being the fact that the house is not tied together or stiffened at all available points. Good construction always gives the opportunity to spike the horizontal and vertical timbers together. This is also important in roof construction and the collar beams should be so placed as to be spiked into the wall studs or roof rafters or both.

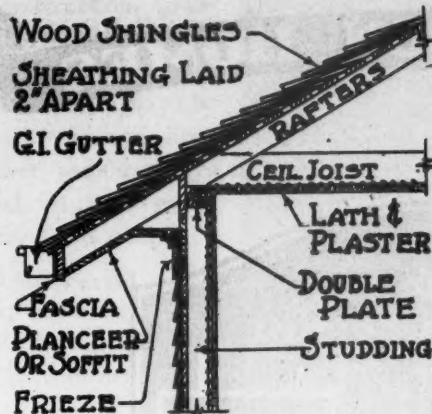
Collar beams should be used at every rafter and well spiked to prevent the spreading of the roof. When dormers are cut into the roof the side studs should run from rafter to floor to assist in supporting the roof and to prevent any joint in the studs.

Over openings on the interior is probably the most noticeable place where the cracking of plaster indicates shrinkage or settlement. This can be avoided by properly trussing over the opening from the timber over the head of the opening to the plate under the floor construction above.

All joists should be doubled where a partition occurs directly above, running in the same direction as the joists. A single joist should never be used for a header except for short spans. Very often when a heater is placed under the center of a long span of joints the heat will shrink the wood more than at the bearings, causing a bending in the floor in the center.

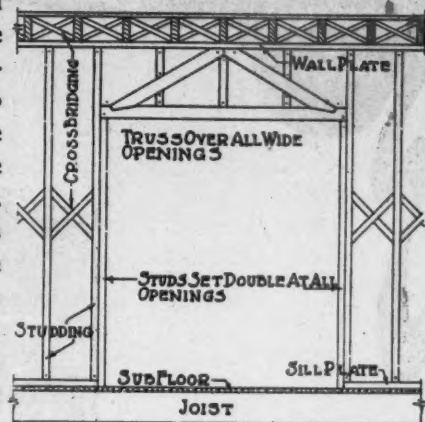
Footings averages about 8 inches in depth and projects about 4 to 6 inches on each side of the wall.

Another way to avoid future shrinkage is to frame the joists flush into the girder instead of over. This flush framing may require more labor, but is worth the extra expense in the long run. Builders should take precautions to oversee the work of the plumbers and electricians and other tradesmen and see that they



Wall Section Thru Roof.

do not cut into the joists or bearing timbers at any place where it would weaken them. They are not interested in construction as a separate study and consequently do not often realize the importance of this work. Cutting of joists should always be done near the bearing and preferably on top where it weakens the material least.



Method of Trussing Over Wide Openings.

Law for the Builder

(Continued from page 58.)

he made the mortar as provided by the contract, and protected it as he agreed, and performed the work as he was directed or permitted to do by defendant's proper authorities, he is not responsible for the condition of the wall caused by freezing. He did not guaranty that the wall should stand the weather. That risk was assumed by the defendant. . . ."

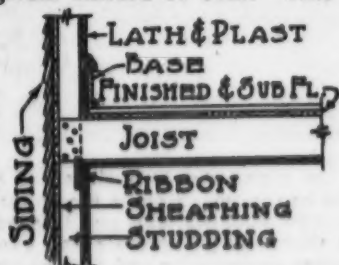
The court in conclusion affirmed the judgment rendered in the lower court in favor of the contractor. Holding that under all the circumstances of the case the contractor was not liable for the damage caused by freezing.

The two foregoing cases are fair examples of the reasoning of the courts in fixing liability in situations of this kind, and, to summarize, their holdings may be stated as follows: Where the contractor undertakes to do work in cold weather it is his duty to protect such work from freezing. And, unless excused by the terms of his contract, or by the acts of the owner in compelling him to perform the work he will be liable for damage caused by freezing.

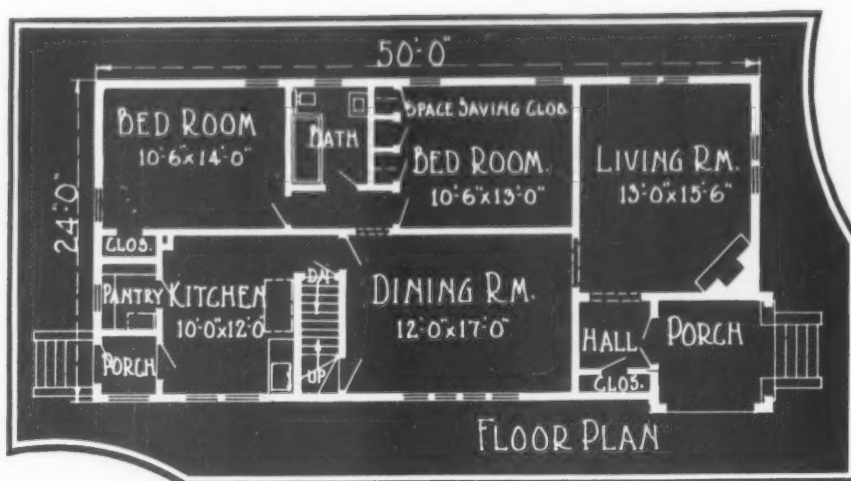
On the other hand, if by the contract the owner assumes direction of the work, and it is performed in strict accordance with his directions and the plans and specifications, the contractor will not be an insurer; and if the work is damaged by freezing the contractor will not be liable.

Construction—Key to Unemployment

IN a letter addressed to W. O. Winston, president of the Associated General Contractors of America, Herbert Hoover, at the close of the present session of the unemployment conference, declared construction to be the key to the present situation. For, as shown at the conference, every 200 men employed in actual construction sets to work from 500 to 700 men in other basic industries, such as lumber, cement, transportation, mining, manufacturing, etc.



Wall Section at Second Floor Line.



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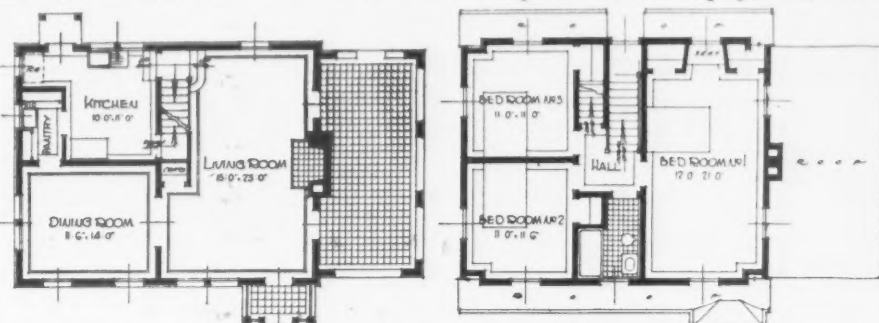
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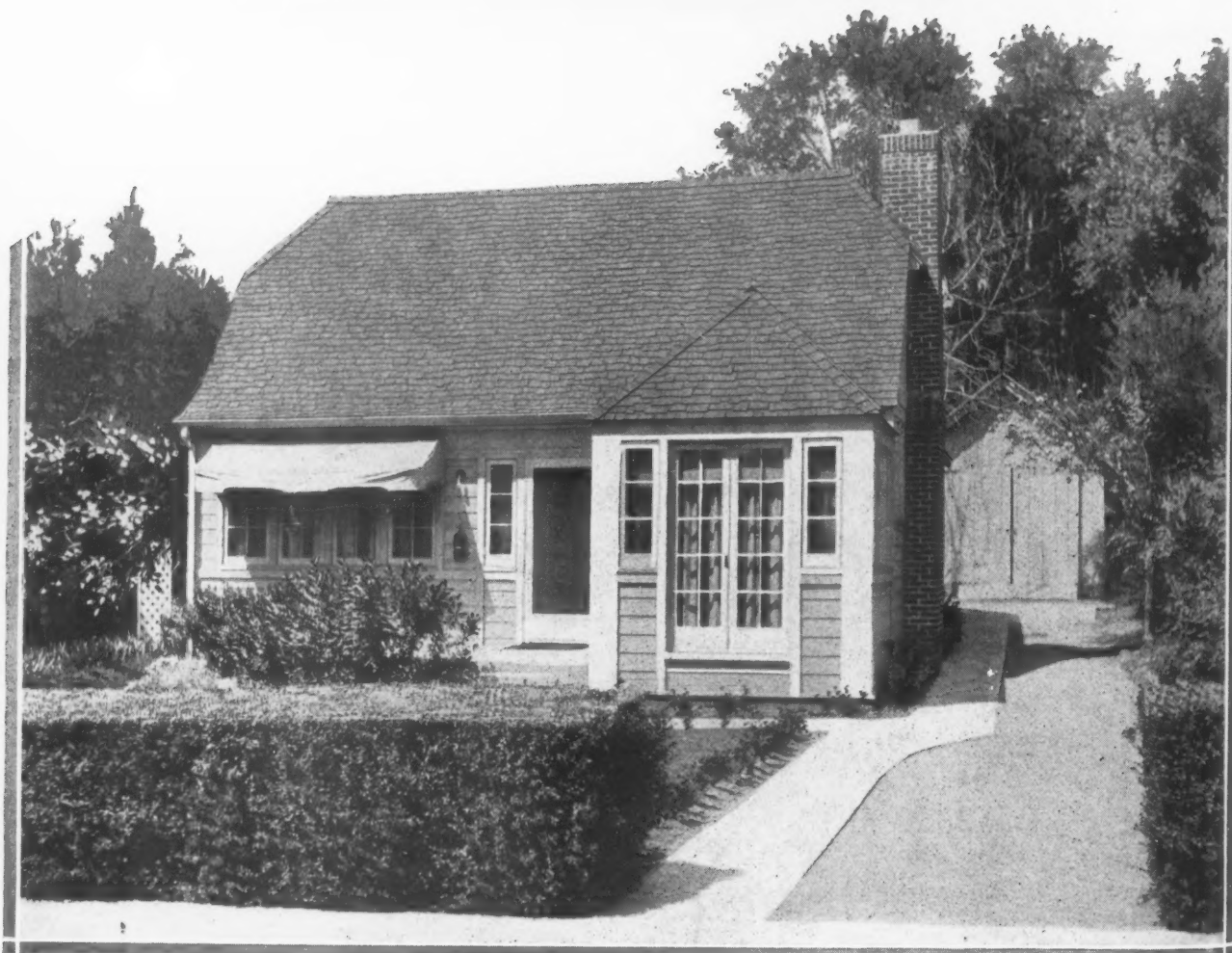
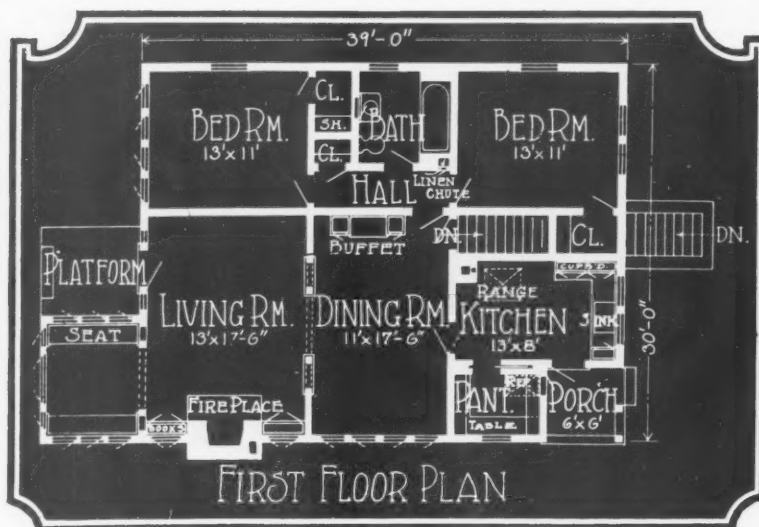
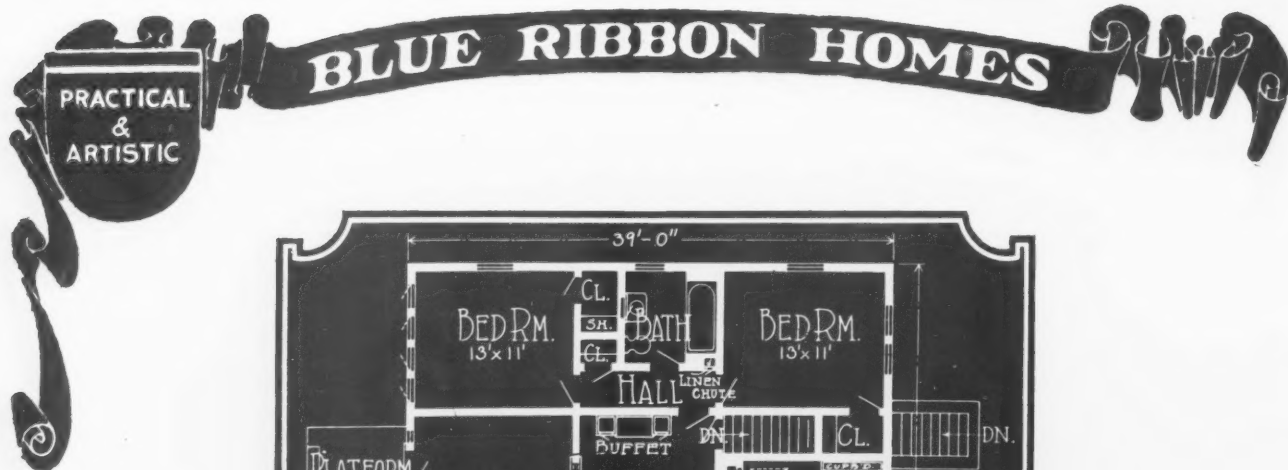


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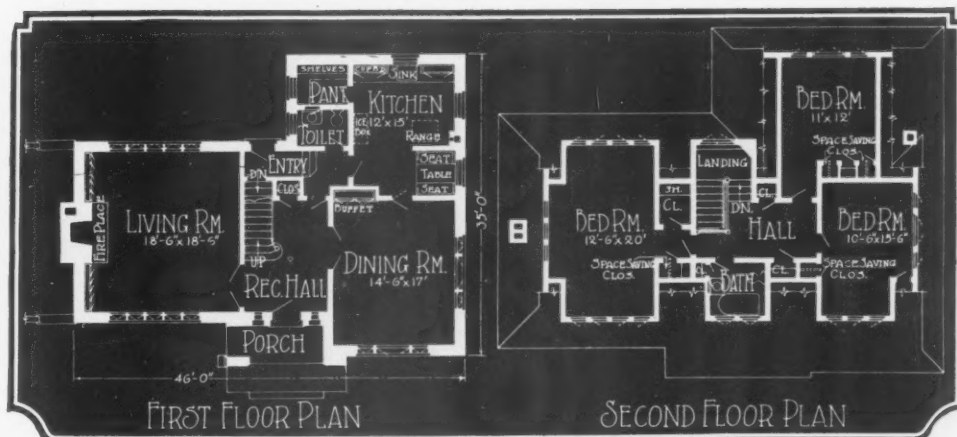


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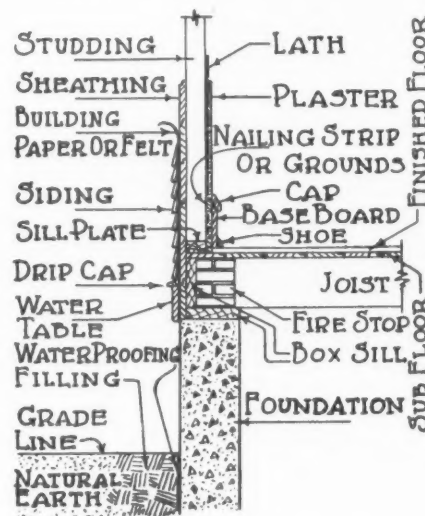
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In case the ground is

poor and it is necessary to dig the excavation larger than the exact walls to prevent the earth from caving in, it is a good idea to put some broken stone or cinders at the bottom before filling back the earth. This forms a channel for water that may get in there and allows it to escape rather than lie against the wall. Where water

conditions exist, it is good practice to place a terra cotta pipe or drain tile around the walls on the outside or inside below the top of the footing or the bottom courses of walls in which there are no footings. These drain pipes should be laid with open joints and graded to

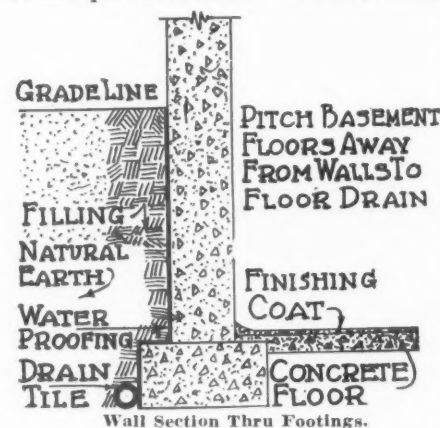


Wall Section at First Floor Line.

low points and then drained to the nearest point of disposal.

In many sections of the country cellars are omitted and the foundation consists of several separate piers (in the case of frame dwellings or solid walls). It is important to see that these piers and walls are built in proportion to chimneys so as to avoid any possibility of unequal settlement. In most cases the foundations

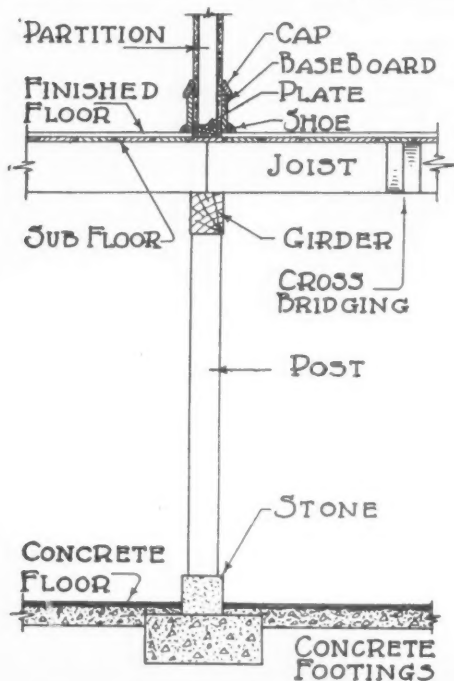
of the chimneys are better proportioned to the soil bearing capacity than the piers supporting the houses. As a result, the chimney has very often remained stationary while the weight of the



Wall Section Thru Footings.

building caused the piers to settle, resulting in a badly cracked interior.

In frame dwellings with masonry foundations, the foundation is carried to the level of the bottom of the first story joists which are then set directly on the wall and notched over and spiked to a wood plate which is first placed on the wall and bedded in cement near the outside edge. The wood studs should be carried down



Post in Basement Supporting Floor and Partition.

to the plate and be spiked to the joists wherever possible. This ties the exterior walls to the joists and avoids danger of any spreading of the building from the weight above. Whenever possible, wood in construction should

be laid on the end grain. Wood laid flat is subject to a shrinkage of sometimes three-quarters of an inch in a foot, while the shrinkage when laid on end is negligible.

There are several reasons for settlements in houses, one being the fact that the house is not tied together or stiffened at all available points. Good construction always gives the opportunity to spike the horizontal and vertical timbers together. This is also important in roof construction and the collar beams should be so placed as to be spiked into the wall studs or roof rafters or both.

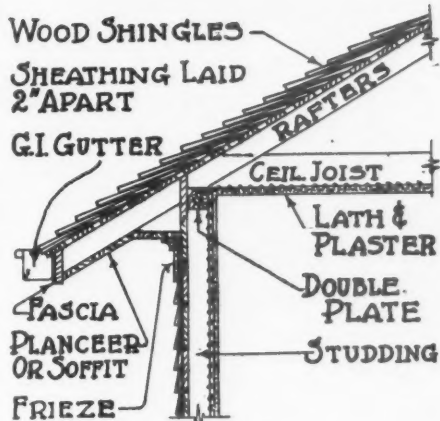
Collar beams should be used at every rafter and well spiked to prevent the spreading of the roof. When dormers are cut into the roof the side studs should run from rafter to floor to assist in supporting the roof and to prevent any joint in the studs.

Over openings on the interior is probably the most noticeable place where the cracking of plaster indicates shrinkage or settlement. This can be avoided by properly trussing over the opening from the timber over the head of the opening to the plate under the floor construction above.

All joists should be doubled where a partition occurs directly above, running in the same direction as the joists. A single joist should never be used for a header except for short spans. Very often when a heater is placed under the center of a long span of joists the heat will shrink the wood more than at the bearings, causing a bending in the floor in the center.

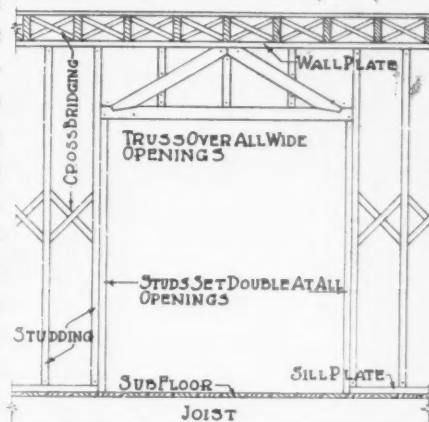
Footings averages about 8 inches in depth and projects about 4 to 6 inches on each side of the wall.

Another way to avoid future shrinkage is to frame the joists flush into the girder instead of over. This flush framing may require more labor, but is worth the extra expense in the long run. Builders should take precautions to oversee the work of the plumbers and electricians and other tradesmen and see that they



Wall Section Thru Roof.

do not cut into the joists or bearing timbers at any place where it would weaken them. They are not interested in construction as a separate study and consequently do not often realize the importance of this work. Cutting of joists should always be done near the bearing and preferably on top where it weakens the material least.



Method of Trussing Over Wide Openings.

Law for the Builder

(Continued from page 58.)

he made the mortar as provided by the contract, and protected it as he agreed, and performed the work as he was directed or permitted to do by defendant's proper authorities, he is not responsible for the condition of the wall caused by freezing. He did not guaranty that the wall should stand the weather. That risk was assumed by the defendant. . . ."

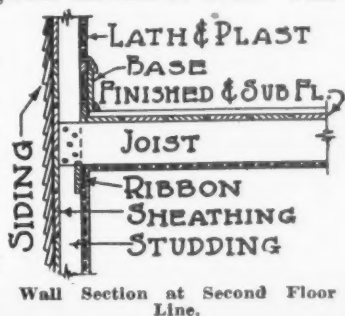
The court in conclusion affirmed the judgment rendered in the lower court in favor of the contractor. Holding that under all the circumstances of the case the contractor was not liable for the damage caused by freezing.

The two foregoing cases are fair examples of the reasoning of the courts in fixing liability in situations of this kind, and, to summarize, their holdings may be stated as follows: Where the contractor undertakes to do work in cold weather it is his duty to protect such work from freezing. And, unless excused by the terms of his contract, or by the acts of the owner in compelling him to perform the work he will be liable for damage caused by freezing.

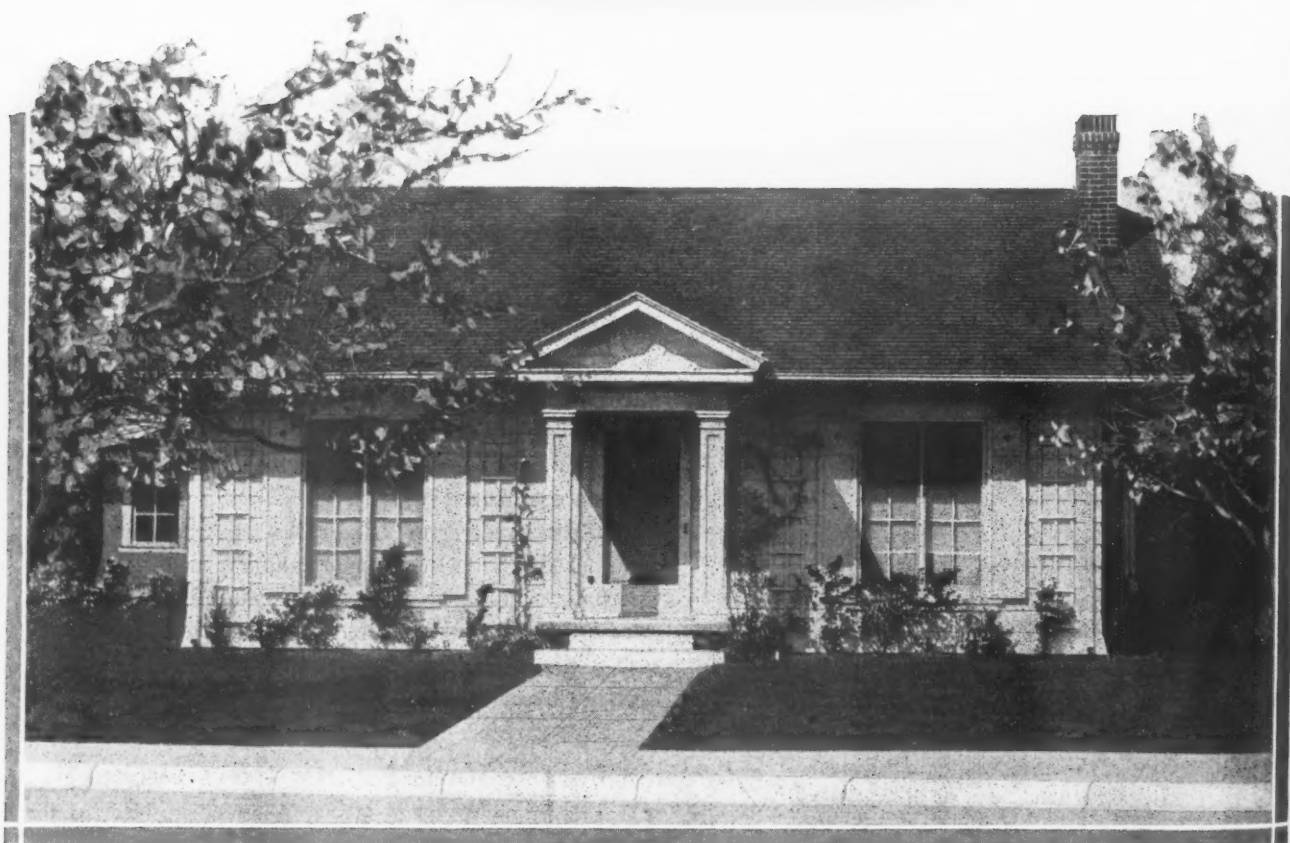
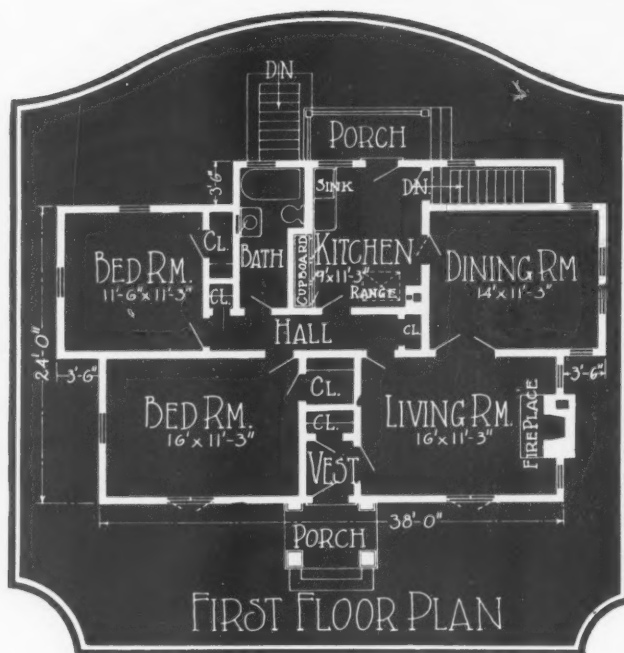
On the other hand, if by the contract the owner assumes direction of the work, and it is performed in strict accordance with his directions and the plans and specifications, the contractor will not be an insurer; and if the work is damaged by freezing the contractor will not be liable.

Construction—Key to Unemployment

IN a letter addressed to W. O. Winston, president of the Associated General Contractors of America, Herbert Hoover, at the close of the present session of the unemployment conference, declared construction to be the key to the present situation. For, as shown at the conference, every 200 men employed in actual construction sets to work from 500 to 700 men in other basic industries, such as lumber, cement, transportation, mining, manufacturing, etc.



Wall Section at Second Floor Line.

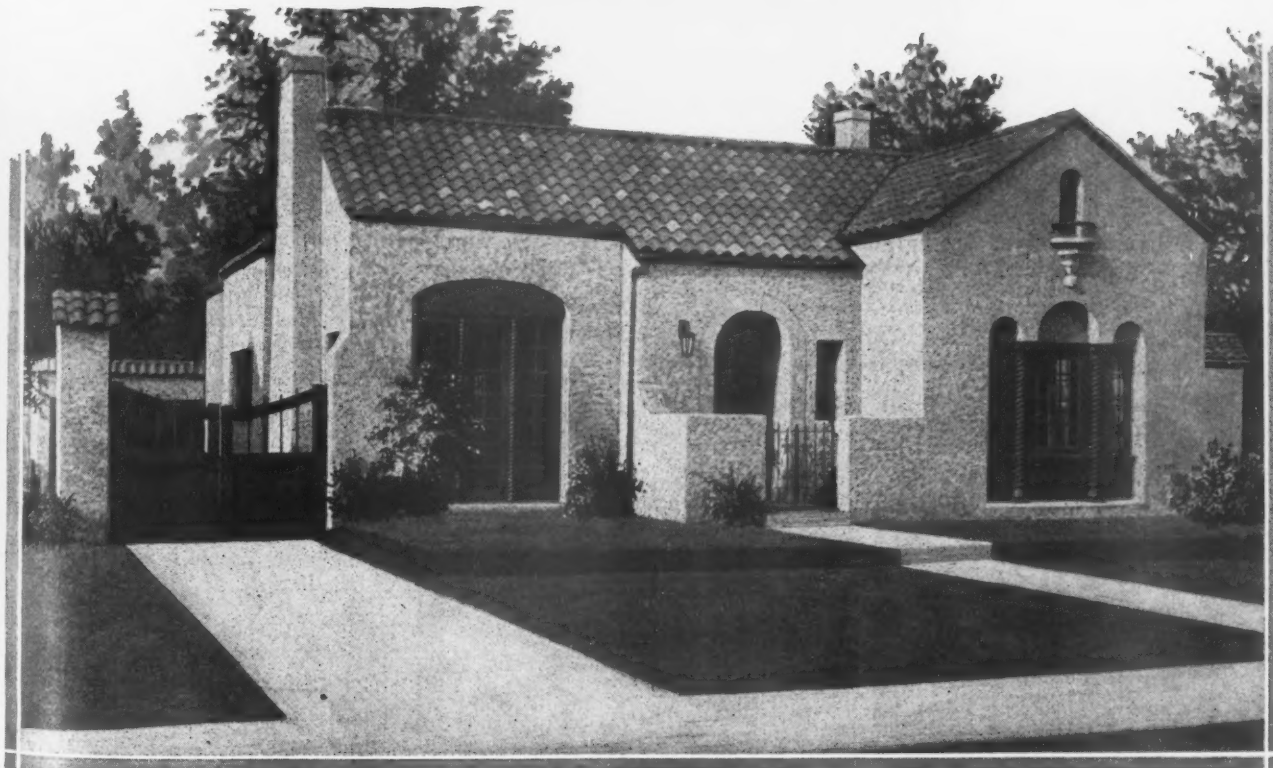
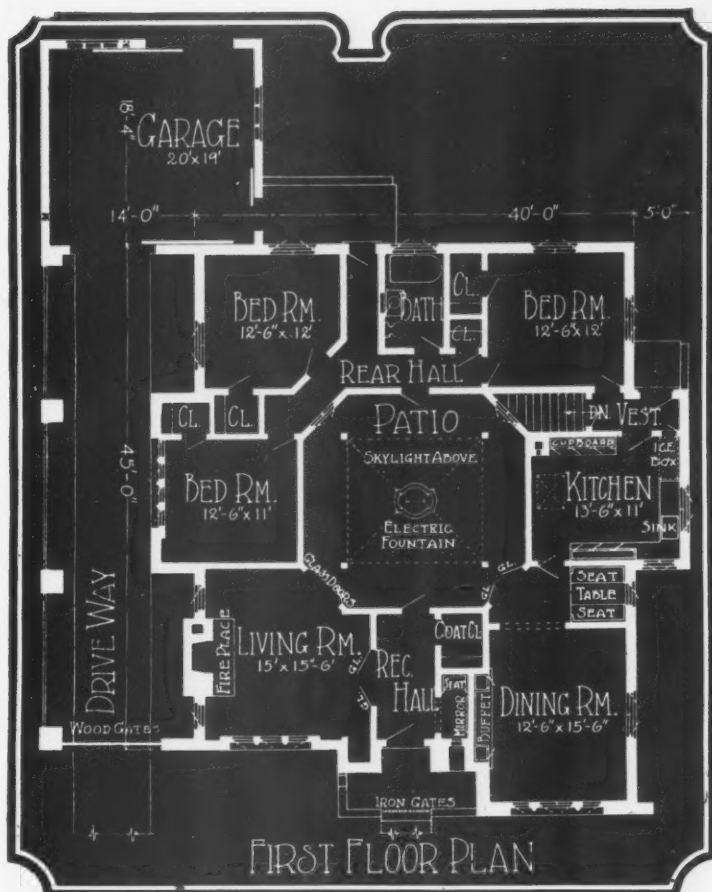


BUNGALOW ADAPTED TO COLONIAL STYLE. On the opposite page is shown an excellent adaptation of the old Spanish mission style of architecture to the modern bungalow. Here is the popular Colonial type expressed in bungalow form. The entrance, the wide white siding, shuttered windows with small panes are distinctive touches of the architecture that never grows old and proves pleasing in this form. There are five cozy rooms in this delightful little dwelling which is designed for the small family. Living room, dining room and kitchen are located to the right of the small vestibule, while the two bedrooms and bath have been grouped at the other end of the house. The whole floor plan does not take up much space, the house being 38 feet wide and 24 feet deep, but each room is quite ample for its purpose and exceptionally bright because of the judicious location of windows.

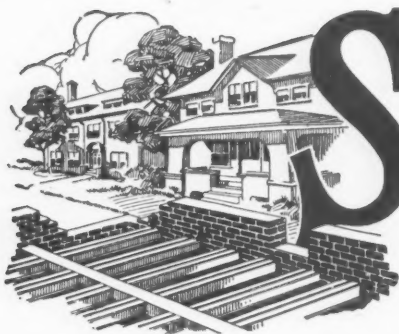
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BLUE RIBBON HOMES

PRACTICAL
&
ARTISTIC



SPANISH MISSION TYPE BUNGALOW. This charming home represents another effective combination of an old architecture with modern ideas. Within is the beautiful patio of the old missions now so famous on the Western coast. Six rooms have been built about this patio, living room, dining room, kitchen and three bedrooms, and a garage in a rear wing. The stucco exterior with ornamental tile roof is particularly pleasing. The house is 45 by 40 feet. In colder climates the patio is covered by a glass skylight.



STEEL LUMBER Construction

Framing Opening for Basement Stairs

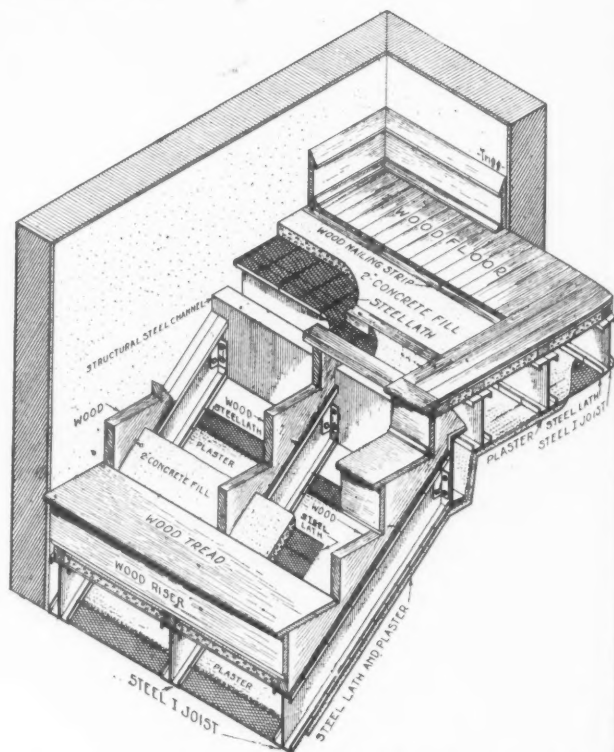
SUGGESTIONS ON ANCHORING STEEL JOIST, MEASURING BY PANELS INSTEAD OF FEET AND FLOOR FOR SMALL BUILDINGS

By Gilbert Canterbury

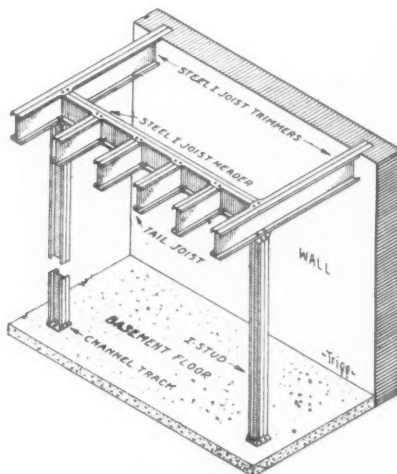
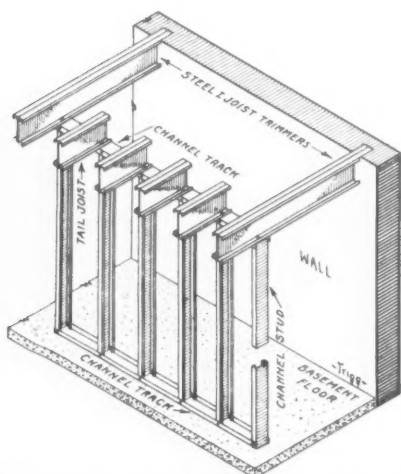
EDITOR'S NOTE—This is the eleventh article of a series on the use of steel lumber in modern construction. Readers are invited to ask questions pertaining to this subject. Answers to all inquiries of general interest will appear each month in this department. Write in your problems now.

DETAILS for framing opening for basement stairs in a firesafe first floor built with steel joists are shown in the accompanying sketches. Both ways indicated are very simple and can be managed on the job. A detail drawing is also shown of a good way to make the stairs firesafe. Close examination of this latter drawing will show that it is built in just the same way a steel joist floor is built, the wood stair-horses being nailed to the steel joists in the same way nailing screeds are nailed to steel joists for wood floor surfacing.

In the average small residence construction, the basement stairway is the only real opening between the basement and the livable sections of the house. When the first floor has been built with steel joists covered by metal lath and a thin concrete slab, the installation of an enclosed stairway like that shown in sketch will render the first floor fire resistive and thus cut off from the livable sections of the home all fire hazards found in basements.



Detail Drawing Showing Method of Making Stair Fire Safe.



Detail Drawings for Framing Opening for Basement Stairs in a Floor Built with Steel Lumber Joists.

Anchoring Steel Joists

Many contractors who take special pride in the general sturdiness of their various constructions have written to this department for information as to the best way to anchor steel floor joists to brick walls. The easiest and simplest way is to use a short length of the one-inch, 20-gauge steel bands ordinarily used for steel joist bridging, doubling it back to form a loop and nailing one end into the web of the joist. A short rod can then be put thru the loop and embedded in the masonry. This practice is illustrated by accompanying sketch.

In residence construction, foundation walls are usually sufficiently braced in themselves and first floor joists need not always be tied into the wall. Second floor steel joists, however, should always be wall anchored, at least every other one or every third one.

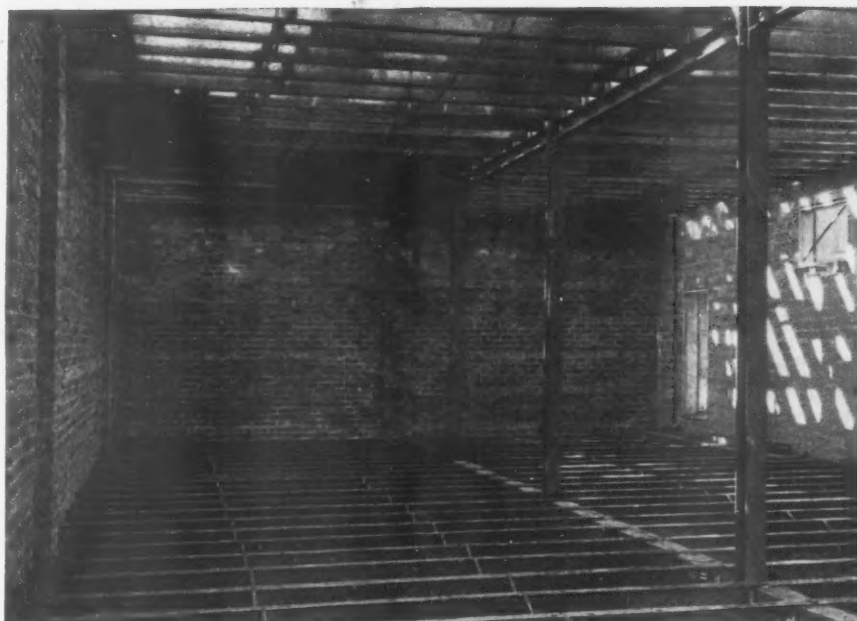
Selling by the Pound

Now and then some contractor complains about the practice of steel lumber mills and dealers of selling steel joists and stud sections by the pound. These contractors say this practice makes it difficult to figure out the actual cost of steel joists for a certain floor area. This objection is really not a well-founded one. It is the experience of most contractors that costs can better be estimated on the poundage or tonnage of steel joists than the footage board measure of wood lumber. Certainly the process of reducing fixed lineal footage into pounds is easier than the rather complex system necessary to develop the board measure of, for instance, two by tens.

In residence floor construction either a 6-inch, 7-inch or 8-inch steel joist will take care of practically every sort of span on either 16-inch or 19-inch spacings. The 6-inch joist weighs 49/10 pounds per lineal foot; the 7-inch joist weighs 58/10 pounds per lineal foot and the 8-inch joist weighs 68/10 pounds per lineal foot. Thus in estimating, thirty pieces of 7-inch steel joists 15 feet long makes 450 lineal feet. Multiplied by 5.8 pounds, which is the weight of the 7-inch joist, gives a total of 2,610 pounds. To check the market on cost for a steel joist specification of this sort, the contractor may telephone any structural steel company for price on 2,610 pounds of 7-inch steel joists cut to length.

Small Business Buildings

One of the most popular uses for steel lumber joists is in the construction of floors and roof for two, three and four story store buildings. The photographic reproduction in this article shows the interior of a small two-story store building in an Ohio city. The building is brick masonry with flat roof. A brick bearing wall is run down the middle of the basement and 9-inch steel joists spaced 19 inches center to center span from wall to wall. Small rolled structural steel



Small Brick Store Building with Inside Structural Material of Steel. Note that the Angle Is Riveted to Web of Second Floor I-Beam as Seat for Light Steel Joists.

columns and a structural steel I-beam provide the central support for the second floor. The columns are footed on the basement bearing wall. Two rows of steel strap bridging brace the joists in each panel. The entire construction as shown in this photograph is neat and orderly, it is utterly incombustible and it possesses the always great and certain strength of steel. The roof of this building is supported on full bearing partitions on the second floor built with 4-inch steel lumber I-studs and channel-studs. The owner says he has been guaranteed a full fireproof insurance rate on his building when it is completed.



Chance of National Economy

PRESIDENT HARDING is urging government economy, and business and financial leaders are telling the public to stop waste, and to work and save in order to restore sound conditions. It could make a good beginning by stopping the preventable fire waste of the country, which amounted to over \$500,000,000 last year, or approximately \$1,370,000 a day. Much is expected from the application of the budget system to national expenditures, but the American people could save more than it will save for them if they will only be reasonably careful about fire.

Carelessness and ignorance normally figure as the chief causes of our fires, but there is also the mistaken belief of many that when property is insured against fire the insurance companies are the only ones to worry if it burns. As a matter of fact, insurance costs are so closely interwoven with our social and economic fabric that we are all affected by the fire waste.

The careless or ignorant citizen responsible for a fire taxes himself as well as his fellows. When this truth becomes recognized by a majority of the American public, then will our fire waste begin to decrease.

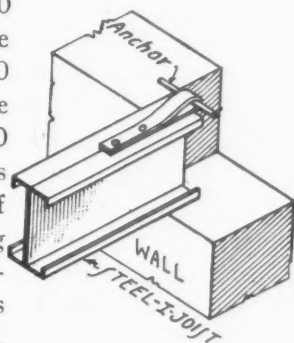


Diagram Showing How Steel Joists Are Anchored.

DESIGN of SAFE CONSTRUCTION

By Charles W. Leigh

Associate Professor of Mechanics, Armour Institute of Technology

Stresses Due to Wind and Dead Load

ARTICLE TWENTY-THREE OF AN EXTENSIVE SERIES ON THE STRENGTH OF MATERIALS

IN the October number of the AMERICAN BUILDER I discussed methods for finding the reactions on a roof truss when carrying a wind load. In this article I propose to take a roof truss carrying both dead and wind loads, and show how to determine the stresses in the members of the truss caused by the combined loads. A case will be taken where one end of the truss is on a roller and the other end fixed. There would then be two cases to consider. First when the wind blows against the roller side of the truss and second when it blows against the fixed side. I will consider only the first case, feeling sure that the method will be clear enough to the reader to enable him to handle the other case by himself.

Consider a roof truss of the type shown in Fig. 1. The distance between the joints of the upper chord is 10 ft., and the trusses are spaced 12 ft. apart. The roof area to be carried by each joint would be $10 \times 12 = 120$ sq. ft. If we assume that a load of 20 pounds per square foot will take care of the weights, purlins, roofing and trusses, then each full joint will carry a load of $20 \times 120 = 2400$ lbs. Now it is not probable that the maximum snow load and wind loads will occur at the same time. Then assume 10 lbs. per square foot of roof surface as a minimum snow load. At each joint there would be a load of $10 \times 120 = 1200$ lbs. Or a total of $1200 + 2400 = 3600$ lbs., while at the ends or half joints a load of 1800 lbs. Since the truss is symmetrical and symmetrically loaded, the reactions are equal. The loads and

reactions are shown in Fig. 1. The truss is lettered according to the scheme followed in previous articles.

The force diagram is now drawn as shown in Fig. 2, to the scale $a b = 1800$ lbs. The stresses are scaled and tabulated as follows in the scheme shown farther along in the article.

The angle of the roof is taken at 30° . If we assume a force of 40 lbs. per square foot of vertical surface for a maximum horizontal wind, then from the formulas for wind pressure perpendicular to the roof, we would get 32 lbs. The formula referred to is

$$P_n = P \frac{2 \sin A}{1 + \sin^2 A}$$

where $P = 40$ lbs. and $\sin A = \sin 30^\circ = \frac{1}{2}$.

To make the computations easier we will use $P_n = 30$ lbs. per square foot. Then the load carried at each full joint is $10 \times 12 \times 30 = 3600$. At the half joints there would be 1800 lbs. The loads and lettering are shown in Fig. 3.

As in the previous article the assumption is first made that the reactions are parallel to the wind loads, and are designated in this position by R_1^1 and R_2^1 . The force diagram ABCDE-O is drawn. Beginning at t on R_1^1 and ab, we draw a line parallel to OB to meet bc at V and etc., thus locating t, u, v, w, x. The line tx determines the direction in which to draw a line from O to cut AE in I¹. Now EI¹ and I¹A would be the reactions under the first assumption. But there is a roller under the left end and therefore the reaction is

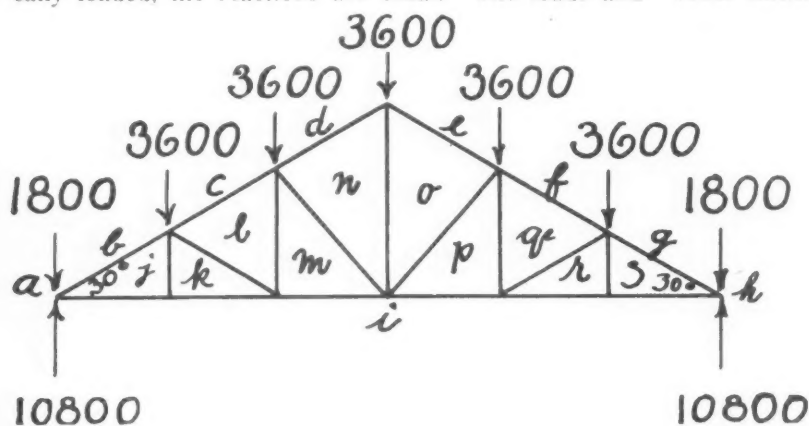


Fig. 1. Dead Load and Snow Load Diagram for a 6-Foot Panel Queen Truss.

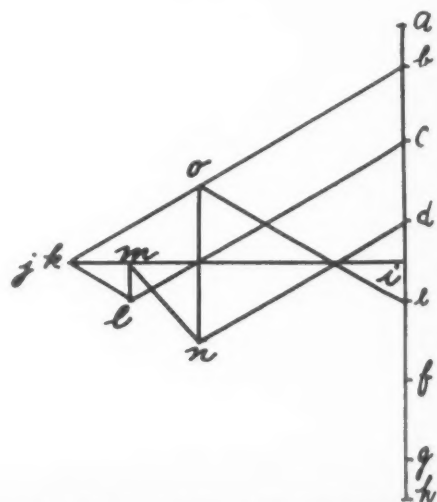


Fig. 2. Force and Stress Diagram for Fig. 1.

entirely vertical. All the horizontal component of the wind is taken by the right support. Then thru A, draw a vertical line to meet a horizontal line thru I¹ at I. Then EI is the right reaction R₂ and IA the left reaction R₁.

In order that the diagrams of figures 1 and 3 might be compared, the letters f, g and h are used. Since there is no wind loads on the right side of the roof there are no loads ef, fg, and gh. This is shown in the space diagram of Fig. 3, by E, F, G and H coinciding. In fact in any stress diagram if two letters are found to fall at the same point, the stress is zero in the member between those letters.

To construct the stress diagram, begin at the left hand joint, starting with force R₁, or I to A, then A to B. From B, draw a line parallel to bj to meet a horizontal line thru I, parallel to ji. This determines J. All the stresses at joint 1 are now known. Next take joint 2, beginning with I J. Now draw thru J a parallel to jk to meet a horizontal from I parallel to ki. But this makes J and K coincide, indicating no stress in jk.

At joint 3, begin with K J, then J to B, B to C, then thru C draw a parallel to cl, to meet a line thru K parallel to lk. This determines the joint L.

In this way we proceed from joint to joint until all the joints are located. The diagram shows that I, O, P, J, S and R coincide showing no stresses in pi, ri, si, pq, op, qr, and rs. It so happens that in the truss chosen the right hand reaction is in the same line of the stress in the members of the upper chord and hold it in equilibrium. This is a coincidence and is not to be taken as true for other types of trusses.

Now I have scaled off roughly the stresses from diagrams of figures 1 and 3 and tabulated the results

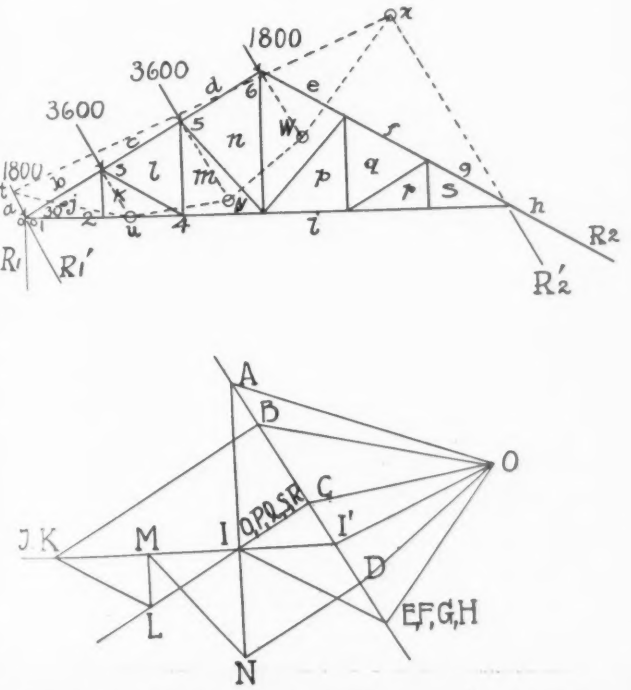


Fig. 3. Wind Load Stress Diagram for a 6-Foot Panel Queen Truss.

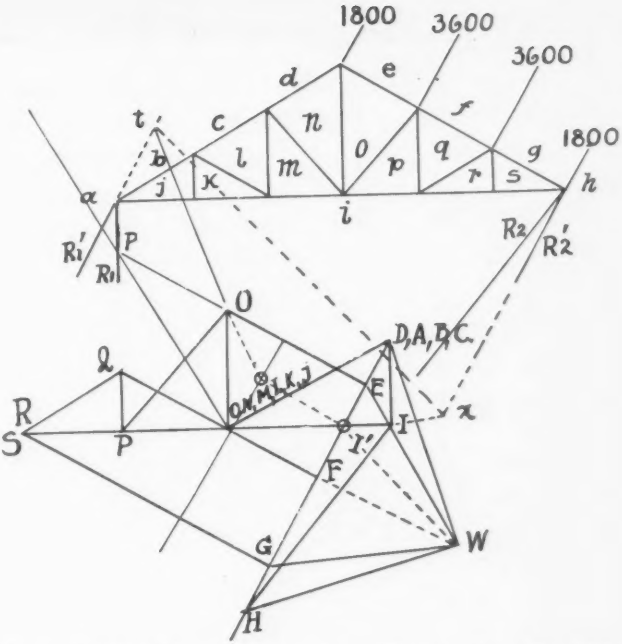


Fig. 4. Showing Stress Diagram for a Wind Load on the Right Side of the Truss with Right End Fixed.

in columns 2 and 3 of the following table. I make no claim for accuracy in these results. They are taken roughly to illustrate a certain principle. The last column is the sum of the stresses produced by the loads in the same member. This represents the maximum

Members	Stress for Dead Load	Stress for Wind on Left	Combined Stress for Figs. 1 and 2	Stress for Wind on Right	Combined Stress for Figs. 1 and 3	Maximum Stress
bj...	-18000	-9360	-27360	-6400	-24400	-27360
cl...	-14670	-7200	-21876	-6400	-21076	-21876
dn...	-11100	-5220	-16320	-6400	-17500	-17500
eo...	-11100	-6300	-17400	-5850	-16950	-17400
fq...	-14670	-6300	-20970	-7875	-22545	-22545
gs...	-18000	-6300	-24300	-9900	-27900	-27900
ji...	+15600	+7200	+22800	+5850	+21450	+22800
ki...	+12600	+7200	+19800	+5850	+18450	+19800
kl...	-3320	-4160	-7480	.....	-3320	-7480
lm...	+1720	+1980	+3700	.....	+1720	+3700
mn...	-4915	-5400	-10315	.....	-4915	-10315
mi...	+13015	+3470	+16485	+5850	+18865	+18865
no...	+7200	+4100	+11300	+4275	+11475	+11475
op...	-4915	.....	-4915	-5850	-10765	-10765
pi...	+13015	.....	+13015	+9850	+22865	+22865
pq...	+1720	.....	+1720	+2250	+3970	+3970
qr...	-3320	.....	-3320	-4050	-7370	-7370
rs...	.....	.....	.....	.....	.....	.....
ri...	+12600	.....	+12600	+12880	+25480	+25480
si...	+15600	.....	+15600	+12880	+28480	+28480
kj...	.....	.....	.....	.....	.....	.....

stresses for which the members must be designed under the assumptions made originally.

It now remains to have the wind blow against the right hand side of the truss, and calculate the wind stresses for that case. Fig. 4 shows the same wind load as in Fig. 3, but blowing on the right side. As in Fig. 3, the left reaction under the roller is vertical. By constructing the force polygon, and then the funicular polygon on the space diagram, the line tx determines the direction of the line OI. From this HI is found for the right reaction R₂ and ID for the left reaction R₁, D, A, B, C are at the same point because of no loads ab, bc and cd. The stress diagram

(Continued to page 108.)

Bungalow of Attractive Exterior and Charming Interior

MANY BUILT-IN FEATURES AND ARTISTIC DECORATION GREATLY ENHANCE BEAUTY OF COZY HOME

By Charles Alma Byers

WITH its delightful little corner porch, its latticed *porte-cochere*, and its pleasing structural lines, the bungalow illustrated here comprises a most attractive home. It also has a practically planned and home-like interior.

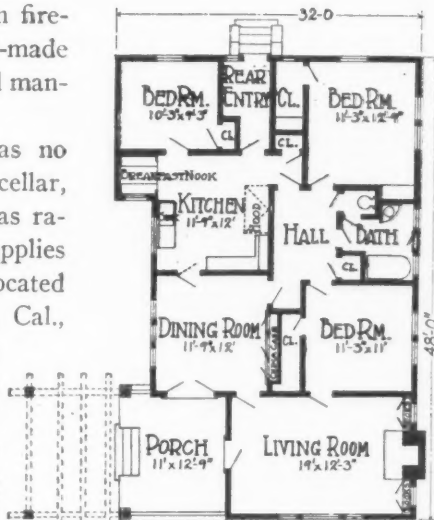
The outside walls are of narrow re-sawed siding, painted a very light shade of cream, and the trimming is done in pure white, while the shingled roof is light grayish-green. The little porch is floored with cement, and its foundation walls and the chimney are of red brick. A window box is an improving feature of the front windows.

The house contains a number of very convenient built-in features. These include bookcases at each side of the living room fireplace, a buffet in the dining room, linen shelves in the hall, a combination of linen cabinet, box seat and medicine case—the last named having a mirror set in its door—in the bathroom, a Pullman breakfast corner with stationary seats and table off the kitchen, and so forth, while each bedroom has a good closet.

The interior woodwork is of pine thruout, which in the living room, dining room and front bedroom is finished in old ivory, and elsewhere in white. The walls of the three bedrooms just named are papered, and those of the bathroom and kitchen are finished to the top of the windows and doors with a smooth, hard plaster coat which is enameled like the woodwork, while the walls elsewhere are tinted. Hardwood flooring is used thruout, except in the bathroom and kitchen, tile being used in the former of these two.

The living room fireplace is of hand-made tile, with a wood mantel-shelf.

The house has no basement or cellar, and a built-in gas radiator system supplies the heat. It is located in Los Angeles, Cal., and was designed by John R. Avery, of that city. The present building cost is estimated at approximately \$4,500 complete, including garage.



FIRST FLOOR PLAN

Floor Plan of Western Bungalow Shown Below. There Are Six Rooms and Breakfast Nook.



Mexico Exempts New Building

THE governor of the Federal District has promulgated a decree by which property owners who put up new dwellings will be exempt until June 30, 1926, from federal and municipal real estate taxes, from water, paving, sewer, and sanitation taxes, and from building license fees from the beginning of construction. The following conditions are imposed: Construction must be finished within a year after it is begun, and exceed land value one-half.



Many Built-In Features Make This Pretty Bungalow a Worth-While Investment for the Prospective Home Owner. The Exterior Treatment Is Very Artistic and the Room Arrangement Efficient. It Was Designed by John R. Avery, Architect, Los Angeles, Cal.

SMALL JOBS FOR RURAL BUILDERS

Installing Lightning Rods on Farm

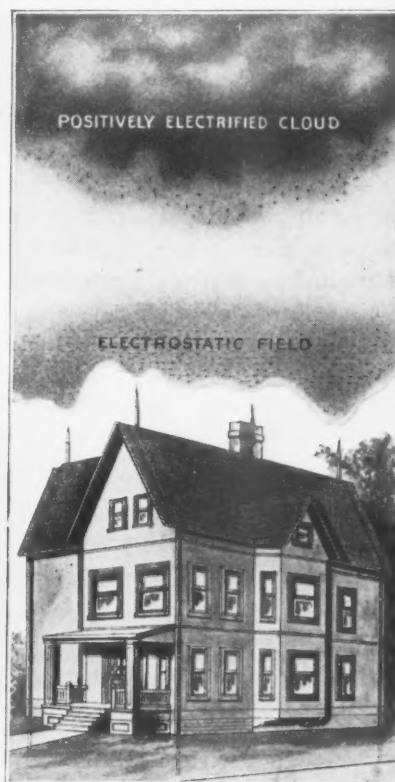
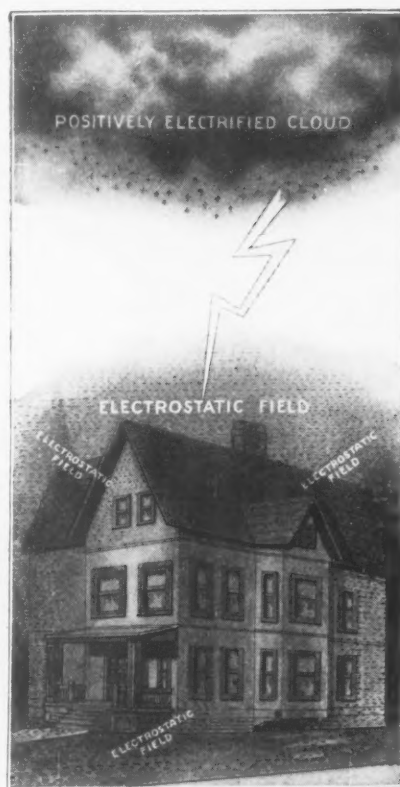
DURING 1920 there were 38,266 farm fires in Indiana, according to the State Fire Marshal's report, and 19,820 of these, or 52 per cent, were caused by lightning. Every one of these fires was in buildings not rodded; in other words, there were no recorded farm fires in the state in buildings protected by lightning rods.

The Industrial Commission of Wisconsin reports that during the year 1920 there was a loss of \$958,925 caused by lightning fires in unrodded buildings and only \$64,185 in rodded buildings, and a careful investigation showed that in each instance where rodded buildings were struck there were serious defaults in installation or material.

Rather convincing figures, are they not? They show two important things—the terrific loss sustained by fire caused by lightning each year and the effectiveness of the lightning rod as a protection. The lightning rod, like a great many useful articles, suffered for years because of improper material and poor workmanship. Twenty or thirty years ago the lightning rod canvasser was usually irresponsible and ignorant of the first principles of lightning protection. His object was to sell regardless of results and he found his chief victims among farmers whom statistics show suffer most from lightning. Irresponsible manufacturers and unscrupulous selling methods resulted in many unfortunate experiences which caused an undeserved reputation which the legitimate lightning rod has had a hard time living down. A properly rodded structure is safeguarded against lightning to a very high degree, as the figures cited above conclusively show.

Today the installer of lightning rods is the contractor and builder, a reliable member of his community who

is always anxious to give his customers the best of service and satisfaction. They have in many cases become the agents of reputable rod manufacturers and find the work a source of profit. Especially is this the case with the rural builder who builds the barn for his farmer client and then adds the lightning rod to insure it full protection. He handles both sides of this build-



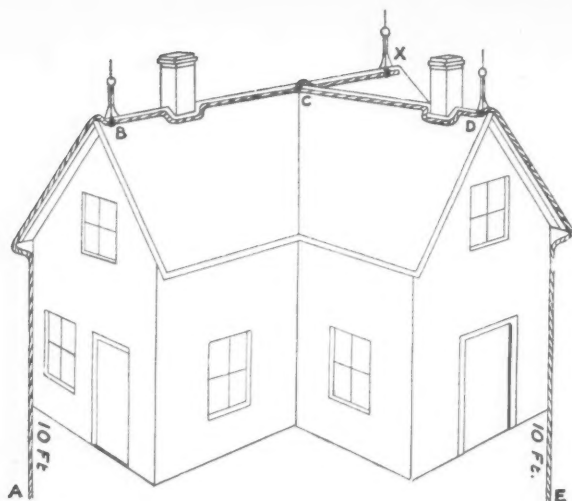
Action of Lightning on House Before and After It Is Equipped with Protection.

ing work. There are many barns still unprotected. This is just the opportunity for the builder to get some extra business.

When talking to your friend, the farmer, who may be just a little prejudiced against lightning rods because of unfortunate experiences in the past, it might be well to explain the cause and action of lightning and the function of the rod when properly installed to convince him.



Thompson's Stock Farm, Page, N. D., Breeders of Purebred Holstein-Friesian Cattle. All Buildings Equipped with Lightning Rods.



Farmhouse Fitted with Lightning Rods. Note the Grounding Arrangement.

When a cloud is charged with electricity at a greatly different potential from that of the earth the air between them, which acts as an insulator, is broken down and an electrical discharge takes place. The thunder is caused by the violent rupture of the air. Now it is evident that the stratum of air between the top of a building and a cloud is thinner than that between the earth and the cloud. In other words, there is less insulating medium to be torn apart. Lightning, like other forces, follows the line of least resistance. If an easier path than the structure is provided it will follow that. Such a path is furnished by the rods and, obviously, these should be placed on all high points.

Sometimes the flash is from the earth to cloud and against this the rod is also protection. It has been satisfactorily established that points on a lightning rod enable the negative charge on the earth to flow into and neutralize the positive charge of the cloud, thus preventing a violent disruptive discharge. Many investigators claim that this is the manner in which lightning conductors come most frequently into play. In other words, the chief efficiency of a rod is in preventing a stroke or so modifying its violence that the conductor will furnish a safe path to ground.

Here are some of the most common defects in installation which builders should avoid in order to have a satisfactory job: 1. Skinning on the job by using underweight material—get your rods from reliable manufacturers. 2. Improper grounding which destroys the efficiency of the rods.

Three safe methods of grounding are pointed out: 1. By connecting the conductor to underground metallic pipes at a point outside the building. Terminals should never be connected to gas pipes. 2. By connecting the conductors to ground plates or other approved grounding devices. 3. To run the base of the rod sufficiently deep into the earth to assure permanent moist condition. Insufficient number of points also should be avoided. All high points should be rodded not merely some on one building on the basis that it is the highest structure. It sometimes happens that a building is con-

nected with a wire fence or clothesline. Another fault to be avoided is the making of sharp bends; no bend should have a radius smaller than 8 inches.



Winter Storage for Vegetables

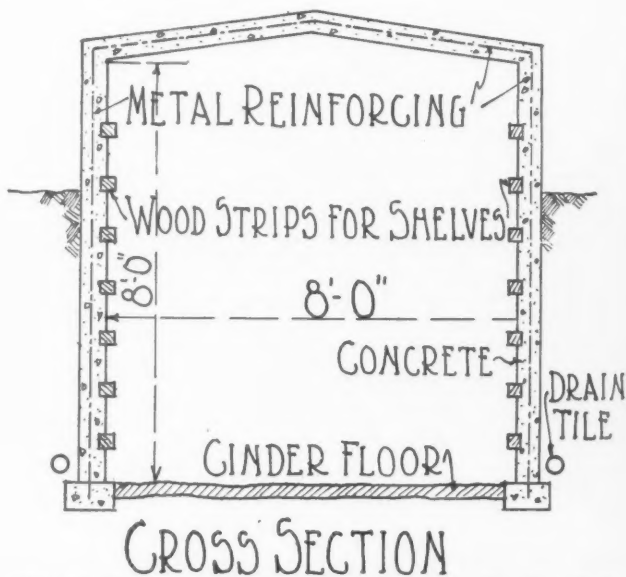
BEFORE the days when concrete became so common on the farm for all sorts of construction, practically every grower of root vegetables stored them in a pit. The pit was excavated in the field and, lined with dry straw. The potatoes, or other vegetables, were placed on the straw and covered with the same material, over which was placed more dirt. This arrangement protected the vegetables from frost and kept them in good condition until the mid-winter market was right for them.

This same principle is employed in the construction of a concrete root cellar. The vegetables are stored below the surface of the ground, thus being protected from the frost, which seldom penetrates more than five or six inches below the surface. The vegetables are as near perfectly dry as possible when they are put in storage, while the concrete walls are protected from the outside surface water by drains placed at the corners.

Shown in the illustration is the cross-section of a concrete root cellar on the farm of J. W. Deal, near Lafayette, Ind.

After the excavation is made, foundation walls twice as thick as the side walls are laid. The forms are set on the foundation, and metal reinforcing material put in the forms. The horizontal pieces are placed on the inside wall of the forms and are left imbedded in the concrete when the forms are removed. They are used as supports for any shelves that might be wanted.

The floor of the root cellar is a thick layer of cinders, which provide good drainage and prevent it from becoming damp and muddy.



Cross-Section of the Vegetable Storage House, Showing Wall Construction.

Housing the Dairy Herd

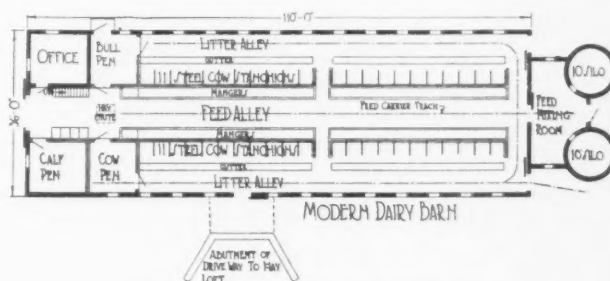
STRONG WELL-EQUIPPED DAIRY BARN IS ONE OF FARMER'S MOST ABLE AND PROFITABLE ASSISTANTS

"AS the farmer goes, so goes the nation," is a maxim that was never before so obviously true as at the present time. Prosperity on the farm reflects optimism thruout the country. Experience gleaned for many years of experience has shown the farmer that the successful corner-stone to prosperity is a dairy herd which yields an all-year-round income. To satisfactorily house this herd is one of the problems of the builder.

How to go about it? A study of the barn shown in the illustration below should offer many ideas. This is a barn large enough to hold at least forty-four head of cattle, twenty-two on each side of the central dividing valley. The building itself is an excellent example of modern farm building. The stable floor is built of hollow tile, while the floor above where the hay mow is located is frame. The timbers in this barn framing are substantial and laid in plank frame style allowing plenty of unobstructed space for a storage floor above the stables. This floor can be reached by horses or trucks over a concrete abutment located on one side of the building. The farmer can drive his load of hay or grain directly into the hay mow. The sliding doors open the way to the main aisle on the cow floor which extends the full length of the structure to the feeding room at the other end where

the silos, which are of brick, 10 feet in diameter, are also located. Extending along this central aisle and along the two outer alleys is overhead carrier track for hauling feed and litter carriers to and from the feed room to the stalls, and to and from the litter alleys to the manure pit.

The steel stanchions and stall partitions are in keeping with the modern type of barn as exemplified in the



Floor Plan of 44-Capacity Dairy Barn.

building. At this end of the building there are the calf, cow, and bull pens, and a small office where the farmer can keep dairy records, etc. Lightning rods on the roof provide fire protection, while ventilators insure a constant supply of fresh pure air for the animals below.

The building is 36 feet wide and 110 feet long.



View of Modern Dairy Barn, 36 by 110 Feet, with Concrete Approach to Upper Hay Mow. This Barn Has Stalls for Forty-Four Cows, Calf and Bull Pens, Record Office, and Large Feeding Room with Two 10-Foot Diameter Brick Silos.



Our Readers are Requested and Urged to Make Free Use of These Columns for the Discussion of all Questions of Interest to Carpenters and Builders

Formula for Paint Remover

To the Editor:

Angels Camp, Cal.

Some time ago a formula was published in your magazine as a paint remover. It contained starch and lye, as well as I can remember. Would you please send the recipe? Thanking you for same.

TERESA E. POOLE.

EDITOR'S NOTE— Evidently the following formula is what you have in mind:

Caustic soda (98 per cent), 1 pound; starch, 2 ounces; china clay, 2 ounces; warm water, 2 pounds; cold water, 2 pounds. Dissolve the soda in warm water and stir the starch and clay well together, adding the water a little at a time until all is used. When the soda solution gets cold add it to the other mixture and stir to a smooth paste. This is used by applying the paint and allowing it to remain for a few minutes, when paste and paint may be removed with a scraper or old brush. The wood should be then washed with clean water and if that does not remove the soapy feel (or taste) another washing with water and vinegar should be given.

Spacing of Hinges

To the Editor:

Bakersfield, Cal.

In answer to Mr. James T. Fairchild, West Van Lear, Ky., in regard to hinges and locks on doors.

The standard spacing of hinges practically all over United States is 11 inches from the bottom of the door and 7 inches from the top of the door. Locks are most always put on 36 inches from the floor to center of knob, except in case of some fancy front door lock and usually it is put on to suit the door.

On a five panel door 36 inches brings the knob in the center of the third rail.

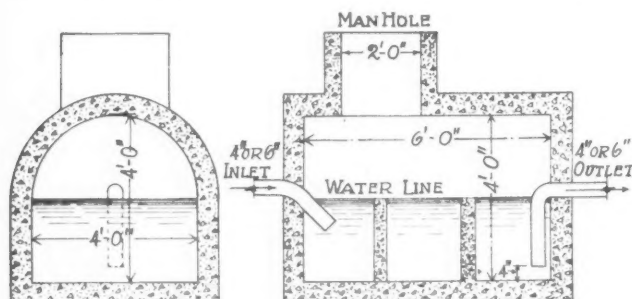
C. M. BIDDISON.

Plan for Septic Tank

To the Editor:

Kewanee, Ill.

Enclosed find a sketch for septic tank requested by Henry H. Reinhart, of Wellington, Mo. This is not my own plan. I received it from a friend at Cambridge, Ill., where a large one



SECTION OF SEPTIC TANK

Sketch of Septic Tank as Drawn by Alfred C. Cady to Help Out Brother Reinhart. It Is 12 by 16 Feet.

was put in for a high school building twelve or thirteen years ago. I think the size was 12 by 16 feet. I have used this size for the last ten years for one or two dwellings. I trust this will help out the boys and do much good.

ALFRED C. CADY.

Two Questions of Interest

To the Editor:

Toccoa, Ga.

Your information on these two questions will be very much appreciated:

1. What is the lightest timber for a 23-foot span that will carry well the weight of a roof 2 by 4-inch 9-foot rafters spaced about 2½ feet apart

2. How may a safe in a building be built to be weather-proof or perfectly dry? The size is about 6 feet 6 inches by 10 feet.

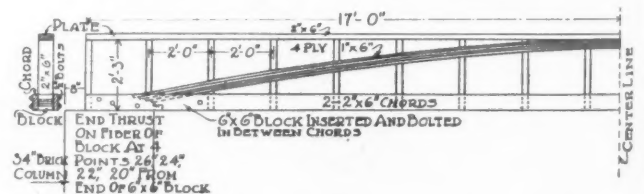
V. GERTRUDE FLETCHER.

Some Questions on Truss

To the Editor:

Inglewood, Cal.

I would like to get a little information concerning a truss for a porch beam. Enclosed is a rude sketch of the truss. The



Sketch of Proposed Truss for a Porch Beam. What Load Will This Truss Carry? Is the Question Asked by Brother Zinninger.

span is 34 feet; rise, 2 feet 3 inches; two cross ties, 2 by 6 by 34 feet long; four ½-inch bolts thru same, and 6 by 6 block as shown. What will this truss carry as a gross live load? What would you recommend as a safe load? There are four 1 by 6's bent as shown and grounded in block so that the end of each board or leaf of truss engages a different set of wood fibers to prevent shear of block.

The top plate is 2 feet by 6 inches by 34 feet long. The studs are also 2 by 6's. The rafters cross on top plate.

E. D. ZINNINGER.

How to Locate Door Butts

To the Editor:

Sun Prairie, Wis.

Replying to James T. Fairchild's question on page 119 of the September issue regarding the location of door butts, I will give him an old rule, which is very good, and which is as follows: Place the top of the upper butt 1 inch from the top of the door for each foot in height of the door and the bottom of the lower butt one and one-half times as far from the bottom of the door. Thus on a 6-foot door it would be 6 inches from top of door to top of butt and 9 inches from bottom of door to bottom of butt, and for a

7-foot door it would be 7 inches from top of door to top of butt, and $10\frac{1}{2}$ inches from bottom of door to bottom of butt. Of course to make all doors symmetrical it might be advisable where there are doors of different heights in the same room to determine the height of the lower butts for all doors by their heights on the principal doors or upon the majority of the doors in the room; also where base blocks are used the above rule might be varied so as to put the bottom of the lower butt even with the top of the plinth block if it would not deviate too far from the above rule.

CHARLES E. STIMSON, Arch't & Eng'n'r.

In Which We Disagree

To the Editor:

Chicago, Ill.

During the many years of practice as an architect, I have seen many poorly arranged dwelling houses, but none so poorly planned as this one. (Blue Ribbon House, p. 96, Sept. A. B.)

There is no connection between the rear part of the building with the front-entrance door. When bell is ringing it is necessary to pass thru dining and living rooms to answer call.

Open porch, no vestibule. Callers will carry mud and snow into best room of the house. A mat at door of no use to clean feet, as it is too exposed to the weather. The rear part is too much cut up. I cannot understand how you can publish plans of a house as poorly arranged as this one.

ALFRED P. WEBER.

EDITOR'S NOTE: Herewith is our reply to Mr. Weber, which we believe will be of interest to our readers.

Dear Sir: Acknowledging receipt of your recent letter, we want to thank you for taking the trouble to write us your criticisms of the house plan, page 96, September AMERICAN BUILDER.

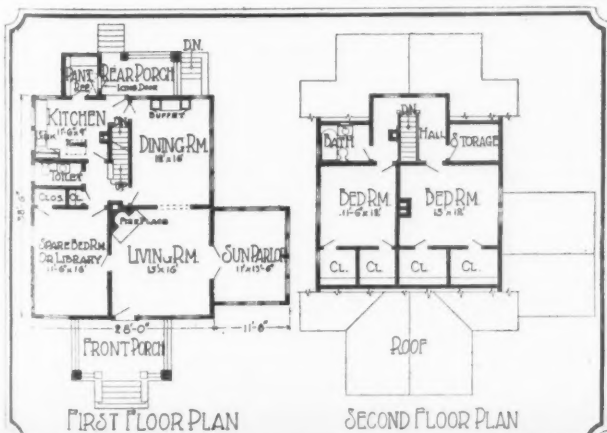
We are not able to agree with you. Under present-day costs, few are able to afford the front vestibule or entrance stair hall that takes up considerable space. If extra protection is wanted in cold weather, put up a storm vestibule. Few families today keep a maid servant and there is very little any more of tending the front door, under which circumstances it is just as proper for the housewife to pass thru the living room as thru the old-time expensive hall.

The kitchen in this design is of good size, 11 feet 6 inches by 9 feet, well lighted with three windows, giving cross ventilation, pantry is well placed, cellar stairs convenient, dining room of very fine size and well lighted, rear hall consumes very little space but accessible from all parts of the house.

There is no accounting for tastes either in architectural plans or in anything else, so we have observed. This looks like a good plan, not an ideal one perhaps, but one within the means of a great many who would like to build a home.

Would you care to submit for publication in the AMERICAN BUILDER your own idea of a good well-arranged home plan?

EDITOR AMERICAN BUILDER.



Do You Like This Floor Plan? Architect Weber Does Not and Told Us So. What Do You Think About It? Don't Be Bashful.

Method of Getting Rod Cuts

To the Editor:

Bakersfield, Cal.

Every month I read an article in the "Correspondence Department" of the AMERICAN BUILDER in regard to laying out a roof and how to get the various cuts.

I have just read the article by F. M. William, secretary, Pensacola Builders' Exchange, and in answer to him I am writing this. His method is quite proper in regard to common and hip rafters as far as he told.

Now to be brief, we will take for a sample a roof to lay out as per sketch enclosed, and will call for a one-third pitch roof.

To lay off a common rafter one-third pitch, use 12 inches on blade of square and rise or 8 inches on tongue of square, cut along blade of square for foot cut and along tongue of square for plumb cut.

The building is 28 feet 0 inch wide, half of building is 14 feet 0 inch, so common rafter has a run of 14 feet 0 inch, now with 12 inches on blade and 8 inches on tongue of square, step along rafter 14 times, getting length of rafter. To check yourself take your rule and take the bridge measure from 12 inches to 8 inches on the square, which will be $14\frac{7}{16}$, multiply $14\frac{7}{16} \times 14 = 202$ inches, or 16 feet 10 inches, length of common rafter.

Deduct from your top or plumb cut of the rafter $\frac{1}{2}$ of the thickness of the ridge board.

The hip and valley rafters are found by using 17 inches on the blade of square and the rise or 8 inches on the tongue of square. The hip and valley rafters are to the common rafter as 17 inches is to 12 inches, so the relation of 17 inches and 12 inches is the same in all pitches of roofs.

Now take 17 inches on blade and 8 inches on tongue of square and step along rafter 14 times same number as common rafter, and also use the bridge measure to check by bridge measure of 17 inches and 8 inches is $18\frac{13}{16}$ inches, multiply by 14 = 264 inches or 22 feet 0 inch, length of valley or hip.

Now, the valley and hip rafters must have a cheek cut to make them fit the ridge board proper. To find the cheek cut take the bridge measure of the run and rise of the hip, which is 17 inches and 8 inches in this case, which makes $18\frac{13}{16}$ and the run 17 inches and cut along the $18\frac{13}{16}$ -inch side; if these figures are too large for your square divide both by 2, making $9\frac{13}{32}$ inches and $8\frac{1}{2}$ inches.

Some carpenters use a forty-five cut, but you can see a forty-five will not make a perfect fit. Also cut half ($\frac{1}{2}$) the thickness of your ridge board from the top end of the valley and hip rafters.

To lay out a jack rafter, you use the same cut for plumb and foot cut as you do for a common rafter, 12 inches and 8 inches give the plumb and foot cut for jack rafters. The cheek cut of a jack rafter is found by a similar method of the hip and valley rafters, only this time we use the common rafter bridge measure and the run of the common rafter, which is $14\frac{7}{16}$ inches and 12 inches. Cut along the $14\frac{7}{16}$ -inch side. Now, the jack rafter that fits into a valley rafter has only the plumb cut

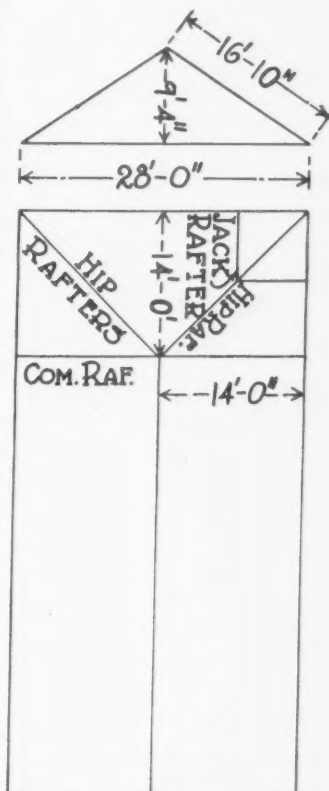


Diagram of Roof Calling for One-Third Pitch, Showing Rafter Cuts.

on top end which fits against the ridge board, and on the bottom it has the plumb cut and also the cheek cut to make it fit into the valley. The jack rafter that fits into the hip rafter has the foot cut the same as the common rafter and the top cut is the plumb cut of the common rafter and also the cheek cut to make it fit against the hip.

To find the difference in length of jack rafters, multiply the length of the common rafters per foot of run by the distance the rafters are spaced. Say the rafters are 2 feet 0 inch on centers, and we know the common rafter is $14\frac{7}{16}$ inches long per foot of run, $14\frac{7}{16} \times 2 = 28\frac{7}{8}$ inches, or 2 feet $4\frac{7}{8}$ inches, which is the difference in length of jack rafters spaced 2-foot 0-inch centers.

If rafters are spaced 30 inches on centers multiply by 2.5 feet 0 inch.

This same method can be used for any pitch of roof as long as you use 12 inches as your base for common rafter on the blade of square and the rise on the tongue also use 17 inches on blade of square and rise on tongue of square for hip and valley rafters.

If you follow this method and be careful and mark and saw your rafters correct, you can always frame your roof on the ground and put it up and it has to fit.

If you want to check this method of framing, find an I. C. S. textbook on the Steel Square, and you will find it identical to the same method, as that is where I found it.

C. M. BIDDISON.



Opinions May Differ About This Question

To the Editor:

Brighton, Mich.

I would like the opinion of some good masons. Will some one who has had experience in plastering on the inside of concrete block walls, where there is a continuous air space, tell me whether or not the plaster wall will be damp and draw moisture from the outside?

This continuous air space wall is built with a tier of blocks 4 inches thick inside and a tier of blocks 4 inches thick outside and an air space of 2 to 4 inches between, all the way up from the foundation to the plate, 8, 10, 12 or 14 feet, whatever the height of the wall may be.

Some masons claim that without lath a plaster wall will draw dampness. I would also like to know if a solid concrete wall is better than a block wall below the ground and above the ground under a building.

CECIL PROSSER.

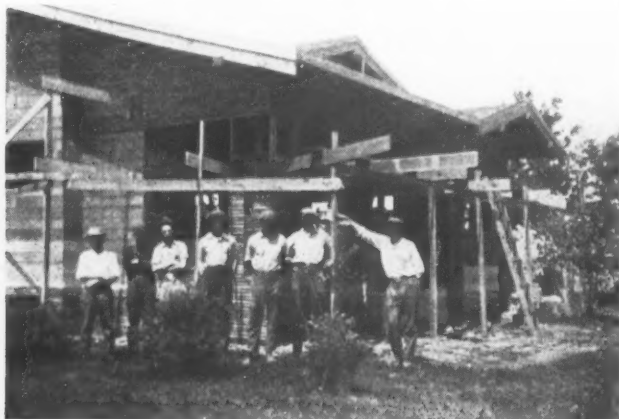


His Home is Strictly Modern

To the Editor:

Ironton, Minn.

I am sending a picture of a residence I have been working on for the well known potato and grain man, B. H. Pettit, of Verndale, Minn. Erick Olson, Ironton, Minn., was the



"Nothing but the Best" Is the Slogan of Knut J. Jacobson, Builder in Ironton, Minn. This Is His Gang of Workmen on the Job.



This Modern Home Has Running Water, Electric Light and Many Other Features Which Are Advocated by the American Builder. Erick Olson Was the Contractor.

general contractor. Bishopric base and Kellastone were used on the outside. Other features are Johns-Manville sheet-asbestos roofing, hot water heat, two individual automatic water systems, well and cistern, built-in bookcases in living room, buffet and wainscoting in dining room, work table, cupboard and ironing board in kitchen, medicine cabinet and dressing table in bath room, Whitney windows in sleeping porch, quarter-sawed oak floors and finish, ash receiver under furnace. With thanks to THE AMERICAN BUILDER editor and brothers for good reading.

KNUT J. JACOBSON.



How to Protect Cement in Cistern

To the Editor:

Enterprise, Kans.

In reply to the request of N. J. Weber of Horrick, Iowa, as to what to put on cement so that the water in the cistern will not get hard nor spoil the cement, I will say that if he will coat it with parafine he will find the desired results. This has been tried out here and has proved successful.

W. E. BOHEY.



In Which We Explain Our Position

To the Editor:

Cambridge, Mass.

The AMERICAN BUILDER is presenting to its readers various illustrations, plans, building details, etc., of beautiful cottages and bungalows. Permit me to say that it is very disappointing to find in the articles not a word as to the cost of the buildings described. What would you think of a salesman who wouldn't tell you the price of a suit of clothes which you fancied?

Now, I know perfectly well what your alibi is. Anyone knows that the cost of labor and materials varies in different parts of the country, of course. But why in the name of goodness can't you say that such a house, built in New York, or in Boston, or Mobile, or Seattle, cost, or would cost, so much?

I hope the AMERICAN BUILDER will resolve in the future never to present or plan any description of a house without stating the cost. Even a millionaire would want to know "what did or will it cost?"

Here are some of the disgusting expressions to be found in building and plan books:

"An inexpensive bungalow." (How inexpensive?)

"A cottage for a working man."

"A house for the man of moderate income."

"A small house of low cost." (How low?)

"A house of moderate cost."

"A bungalow which can be built for a small sum."

"A house which is economical in cost of construction." (Do you mean \$3,000 or \$6,500?)

When I had looked over the October and a previous number of the AMERICAN BUILDER I felt like pitching them into the ash barrel.



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This is not intended as a grouch letter—simply an honest criticism. No doubt hundreds feel as I do.

E. J. O'HARA,

Answer—We appreciate fully the force of your remarks in your letter, and if there was any way of presenting cost figures that would be even approximately correct for all parts of the United States, we would certainly present such figures in connection with the house designs we illustrate in the *AMERICAN BUILDER*. We have often had this matter under consideration.

The fact of the matter is that costs vary anywhere from 25 to 300 per cent in different parts of the United States on the same size and design of building. Differences in wages, freight rates and style of interior finish and special equipment can easily add or subtract several thousand dollars from the cost of the house.

There is only one estimate of cost that is of any value whatever to you or to any other prospective home owner, and that is the estimate made by your local builder who will undertake to stand back of his figure with the actual performance of the contract. His estimate would be of interest to you or to anyone seriously considering building. An estimate or guess by anyone else would really be no better than any of the indefinite descriptive terms which you mention in your letter as being so very objectionable.

Now it will be an easy matter for you to get an estimate from one or more of your responsible local builders. Lay your proposition before them. Get acquainted with them. You will find them ready and eager to assist you. There will be no cost for their estimating service and their advice.

EDITOR.

To the Editor:

Severance, Kans.

I would like to get some information as to how to waterproof a grain elevator basement. The dimensions of the walls are about 20 feet by 30 feet, the floor and side walls are made of ordinary concrete, and of course the water comes thru to a depth of three or four feet.

FRANK CORBETT.

Finding Arc by Higher "Math"

To the Editor:

Cincinnati, Ohio.

Replying to the query by L. W. Callaway of Eureka Springs, Ark., regarding finding the length of an arc having given the length of the chord and versed sine.

I do not know of any formula that will give the length of arc directly, but it can be obtained by a simple application of the principles of geometry and trigonometry. Below is a solution of the problem and a numerical example.

Let AB be the chord and CD the versed sine. By geometry, if two chords intersect within a circle the product of the segment of one is equal to the product of the segments of the other.

To find the diameter of the circle of which ACB is an arc:

$$AD \times DB = CD \times DE$$

$$DE = \frac{AD \times DB}{CD}$$

$$\text{Diameter} = DE + CD$$

$$\text{Circumference} = 3.1416 \times \text{Diameter}$$

$$DO = \text{Radius } CO - CD$$

$$\text{Tangent of } AOD = \frac{AD}{DO}$$

$$AOD \text{ can then be found from tables}$$

$$AOB = 2 \times AOD$$

$$\frac{\text{Arc } ACB}{\text{Circumference}} = \frac{AOB}{360}$$

$$\text{Arc } ACB = \frac{AOB \times \text{Circumference}}{360}$$

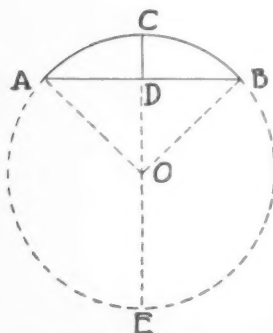


Diagram Showing B. Pepinsky's solution for the arc problem.

Example:

Let AB = 24 inches and CD = 4 inches

$$\text{Then } AD = DB = \frac{24}{2} = 12 \text{ inches}$$

$$AD \times DB = CD \times DE$$

$$12 \times 12 = 4 \times DE$$

$$DE = \frac{12 \times 12}{4} = 36 \text{ inches}$$

$$\text{Diameter} = CE = 36 \times 4 \text{ inches} = 40 \text{ inches}$$

$$\text{Radius} = \frac{40}{2} = 20 \text{ inches}$$

$$\text{Circumference} = 3.1416 \times 40 = 125.664 \text{ inches}$$

$$DO = 20 - 4 = 16 \text{ inches}$$

$$\text{Tangent } AOD = \frac{AD}{DO} = \frac{12}{16} = .75$$

$$\text{Angles } AOD \text{ (from tables)} = 36.87 \text{ inches}$$

$$\text{Angles } AOB = 2 \times 36.87 = 73.74 \text{ inches}$$

$$\frac{\text{Length of Arc}}{\text{Circumference}} = \frac{73.74}{360}$$

$$\frac{125.664}{\text{Length of Arc}} = \frac{360}{73.74}$$

$$\text{Length of Arc} = \frac{125.664 \times 73.74}{360} = 25.74 \text{ inches} = 25\frac{3}{4} \text{ inches}$$

BERNARD PEPINSKY.

What Would You Advise?

To the Editor:

Argonne, Wis.

I would like to learn thru the *AMERICAN BUILDER* from some brother reader whether it is all right to use patent stucco on wood lath or a log house. What I intend to do is this: The logs are placed horizontal, and I intend to strip these vertical with 1 by 2-inch furring strips every 16 feet and use a good wood lath. I want to hear from some one that has had experience along this line.

A. J. EBERT.

Why Lumber is Steamed During Kiln Drying

FROM the questions asked by numerous students taking the short courses in kiln drying at the Forest Products Laboratory, Madison, Wisconsin, it is evident that many who operate kilns and handle lumber do not understand the object of steaming lumber in a kiln. There seems to be a common impression that the purpose of steaming lumber is to "remove the sap." This is far from being the fact, for when lumber is steamed it takes on moisture, as a rule, instead of giving off anything.

The reason for steaming lumber during drying depends on when it is done, but nearly always the treatment is given for one of the following purposes: (1) to heat lumber thru quickly at the start; (2) to relieve stresses which otherwise would produce checking, case hardening, and honeycombing; (3) to equalize the moisture content and condition the lumber ready for use at the end of the run; (4) to kill fungi and insects in the wood.

When lumber should be steamed, how long the treatment should last, and what temperature should be maintained are points which have been determined at the Forest Products Laboratory by experiments on many species of wood. A thorough understanding of the steaming operation is essential, because the whole kiln charge can easily be ruined by too severe a treatment. One of the chief needs of many commercial kilns is proper steaming facilities, without which a high degree of success in the artificial seasoning of wood is impossible.

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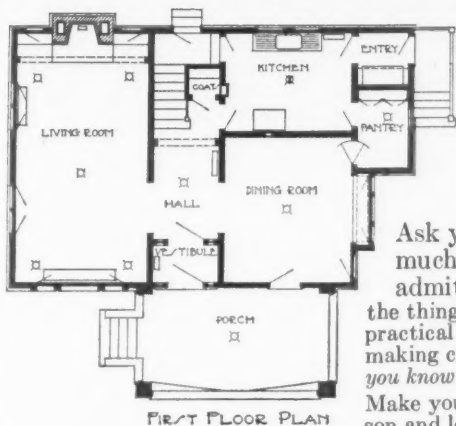
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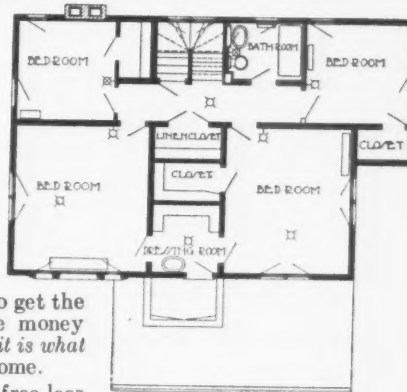
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New Brick Masonry Construction Reduces Costs

HOW NEW TYPE OF WALL IS LAID SO AS TO AFFECT SAVING IN MATERIAL AND LABOR EXPENSE

By William Carver, Architect

IT will come as a distinct surprise to many that a new system of brick wall construction has been devised possessing for many purposes decided advantages over the more traditional way of using brick. It is strange that while, for numberless centuries, brick has been one of the most universally used of all building materials, the building fraternity of all civilized countries should have been content, in the main, to build brick walls according to the methods handed down from antiquity. In a sense, the building industry is to be commended for its conservatism, for mankind has learned by age old experience that the brick wall as ordinarily built is thoroly reliable.

Spurred on by the growing use of a host of other materials carrying a lower price, brick manufacturers have cast about for a method of meeting this competition on a more nearly even price basis without sacrificing the splendid qualities of their material. The Ideal wall is the result.

Briefly, the Ideal wall is laid with standard brick on edge instead of flat; a simple change producing surprising results. It will be noted that no special sizes or shapes of brick are necessary.

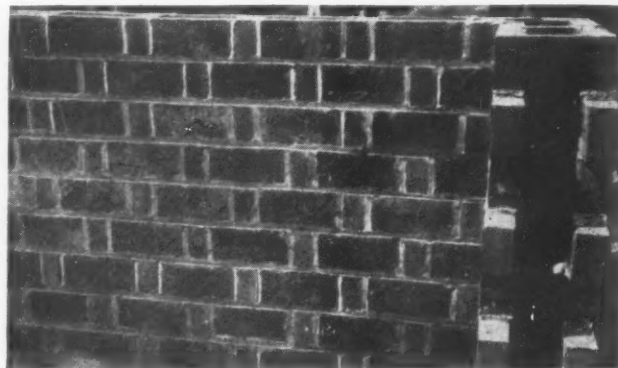
It at once throws the brick wall into the class of hollow walls, for two bricks on edge fall several inches short of the length of a stretcher. Some of the advantages of the wall thus formed are discussed later.

But probably the most important effect of this change is to reduce the cost of the wall and herewith

is the evidence. One hundred square feet of eight-inch wall requires the following material and approximate labor:

Solid wall, full joints, 1233 brick, 20 cu. ft. mortar, 9 hrs. bricklayer's time.

Ideal wall, 904 brick, 8 cu. ft. mortar, 8 hrs. bricklayer's time.

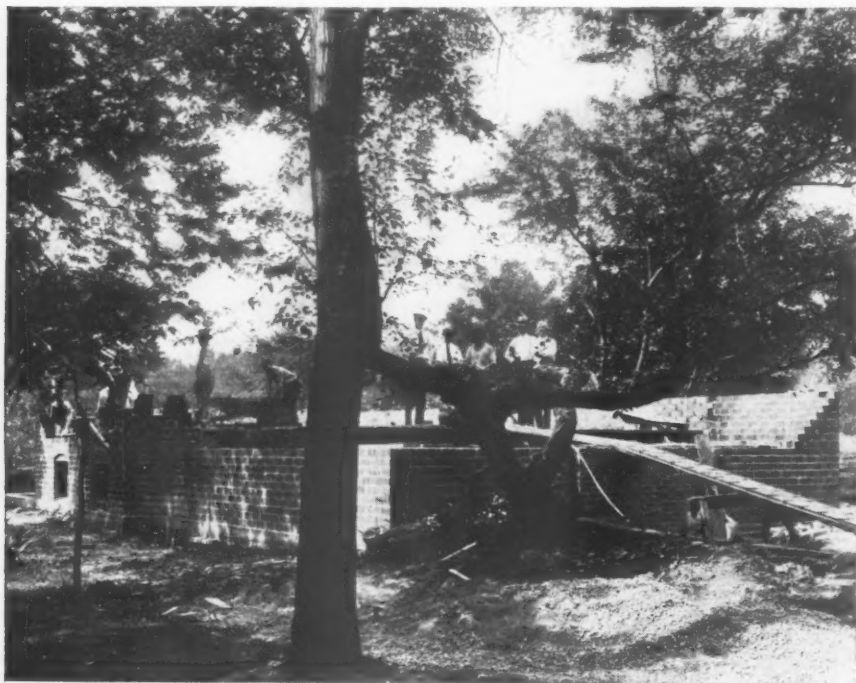


Corner in New Brick Wall Construction Showing Air Space Which Acts as Insulating Barrier.

A comparison of these figures also with those of many brick substitutes will prove enlightening, especially when it is remembered that the Ideal wall can be plastered inside directly on the brick, no furring being required.

It is apparent from the illustration that in Ideal construction no mortar joint can extend continuously from front to back of the wall. In any wall of well burned brick the mortar joint is the only route by which dampness might, in severe and long continued driving rain, be carried to the inside face of the wall, and this is true no matter whether the mortar is of lime or cement.

In an Ideal wall eight inches thick the brick headers constitute the only material running clear thru the wall from front to back, and it has been amply proved by experience that a well burned brick header will not carry the slight amount of rain which can come in contact with its small exposed face clear along its full length by capillary attraction. To aid the headers in keeping dry there is always a slight circulation of air within the hollow space which tends to dry out all suspicion of dampness in the portion of the headers within



Residence Near Chicago, Ill., Built with Ideal Wall. This New System of Laying Brick Is Estimated To Make a Substantial Saving in the Cost of the New Home as the Amount of Brick Used Is Reduced Considerably.

(Continued to page 110.)

The Tale of a Shirt *and the* New Ideal Brick Hollow Wall

The Big Money-Making Opportunities This Construction Offers Builders



"I USED to pull my shirt on over my head," reflected Pat, "and getting out of it was like peeling a banana, now I put it on like a coat just as *aisy* as you please.

"Just happened to think of this," he added, "as I was laying these brick on edge in this All-Rolok Brick Hollow Wall, and I wondered why we hadn't thought of this kind of a wall before—probably for

the same reason we never thought before of a better way to get in and out of shirts."

Pat hit it about right. Several instances are on record of where this new-old type of wall was used both in this country and in Europe many years ago. The Common Brick Industry, however, was the first to nationally advertise this construction, which is the biggest thing for everyone interested in brick construction that has ever been promoted.

It has been advertised only since last January, but is now being used, according to definite records, in over 100 communities. It has received the approval of contractors generally and also the masons. They realize that this kind of construction means incalculably more business for them.

Here's a wall that saves one-third in cost of brickwork. *It means brickwork — good, attractive, durable, fire-resisting brick construction — at a lower cost than any other construction be it wood or masonry!*

You know what people think of brick. They all like it. Practically everyone would like to have a brick home if he could afford it. Now he can. Now you can prove it to him!

The Common Brick Industry of America

1306 SCHOFIELD BUILDING

Cleveland, Ohio



How to Get Business

In these days everything has to be sold. The kind of construction you see the most of is the kind that has the greatest selling effort behind it.

It's possible for you to get vastly more brickwork by actually going after it and pointing out the low cost to start with and the great saving it offers as the years go by.

These Will Help You

You, who make your living by building, should have "*Brick for the Average Man's Home*" and "*Brick, How to Build and Estimate*"—two of the most helpful and practical books on brickwork ever written.

You will find "*Brick for the Average Man's Home*" filled with



strong, forceful arguments for brick, which you can use in talking to people about brick construction. You can interest prospective home builders in brick by showing the home designs and plans in this book.

It contains 35 attractive, small house designs—bungalows, one and one-half-stories, two-families, two-stories, cottages, garages—for all these you can get complete working drawings at small cost. The price of this book is only \$1.00 postpaid—a small sum for such a business getter as you will find this book to be.

Don't Neglect This

When you get a job you want to be able to handle it most economically and satisfactorily. Here's where you will find "*Brick, How to Build and Estimate*" most helpful. It contains 30 tables, nine full page detail drawings and scores of illustrations. This third edition is revised and enlarged and full of new material. *It fully describes and illustrates the Ideal Brick Hollow Wall.* Thoroughly helpful and practical; saves hours of valuable time. 25 cents, postpaid.

The best plan is to send \$1.25 and get both books; address the Common Brick Manufacturers Association, 1306 Schofield Building, Cleveland, Ohio.



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An Innovation in Lavatory Fixtures

A DEVICE called a "wash fountain" has recently been put on the market which is interesting since it promises a saving both in installation and upkeep costs and guarantees a marked sanitary improvement for public and industrial lavatories.

The fountain may be used wherever large washrooms are necessary; in factories, schools, public buildings, hotels and railway stations—in fact every public or industrial lavatory.

The saving in space is considerable, as compared with the old-fashioned wash bowls. It has been shown that bowls for twenty-four people require a minimum of 91 square feet floor space, while the wash fountain accommodates an equal number in comfort, using only 64 feet. This economy naturally increases with each succeeding installation.

The fountains are manufactured in two sizes—a 54-inch basin to accommodate twelve people, or a smaller, 32-inch, where six people may wash at one time. Due to the circular construction of the fountain there is plenty of "elbow room" for the comfort of the users.

The wash fountain is not only a time-saver, but also effects valuable economy in both installation and upkeep costs.

Aptly has one architect summed the whole matter up by saying: "It is collective washing individualized."

Considerable economy is effected in the amount of water consumed. The wash fountain built to accommodate twelve



New Wash Fountain Designed To Improve Sanitary Conditions in Factories, Schools, Public Buildings, etc. It Also Saves Considerable Space.

people, for instance, uses no more water than the amount piped for one washbowl. This is accomplished by converting the flow into a fine stream—just as effective. Hot water costs are also reduced, since the water may be heated at any desired temperature, evenly.

The wash fountain is constructed of a composition of marble chips and concrete, ground finely and polished. The surface is easily cleaned and hard to soil. A cheaper substance, slightly less attractive but equally efficient, is made without the addition of marble, and may be specified if desired.

Soap is supplied to the wash fountain by a device which is part of its design. Either liquid containers of sturdy glass and nickel or receivers to hold cake soap may be specified. The flow of water is controlled either by a hand-valve or a foot-lever, as desired.

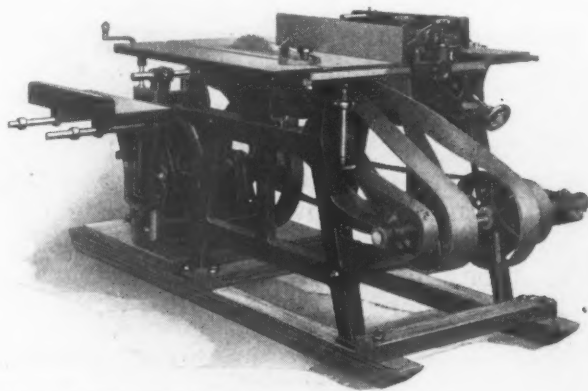
A very attractive ornamental fountain has been adapted from the wash fountain design by the manufacturers for use in hotel lobbies, buildings and theaters.



Light Weight Power-Equipped Saw Rig

ONE of the most important items in a contractor's line of equipment is a woodworker that can be easily handled on long and frequent jumps from one job to another. Portability is the chief feature of a new saw rig shown in the illustration below.

This saw rig is built to carry its own power with it in the



Light Portable Saw Rig Equipped with Power and Having a Sawing Capacity up to 14 Inches. It Is Easy to Carry About from Job to Job.

form of a 3 h.p. gas engine. The machine is a unit in itself and carries saw up to 14 inches. It is intended for sawing up to a capacity of 4-inch stock and is also equipped with a jointer attachment for 6-8 inch stock. Regular equipment includes saw table, complete set of saws, engine, belting and jointer. Extras that can be used are boring attachment, mortising attachment, sand drum and disc sander.

A smaller edition of this same machine has also been designed for contractors who do not require a large saw rig. This lighter engine has a 2 h.p. engine and is fitted with saws up to 12 inches.



Heating the House with Fuel Oil

ONE of the most interesting developments in home-heating has been that of the oil burning heater used in connection with regular heating plant apparatus. In view of the high cost of other fuel this device is being installed in many homes.

On page 92 is shown one type of oil burner as it appears installed in a typical hot water heating plant. The pumping end of the mechanism is outside while the burner is located in the firebox of the heating plant. Fuel oil is stored in a

Asbestos Roofing is more than profitable

OF course you must make a profit from every roofing job you do. That's easy with Johns-Manville Asbestos Roofing.

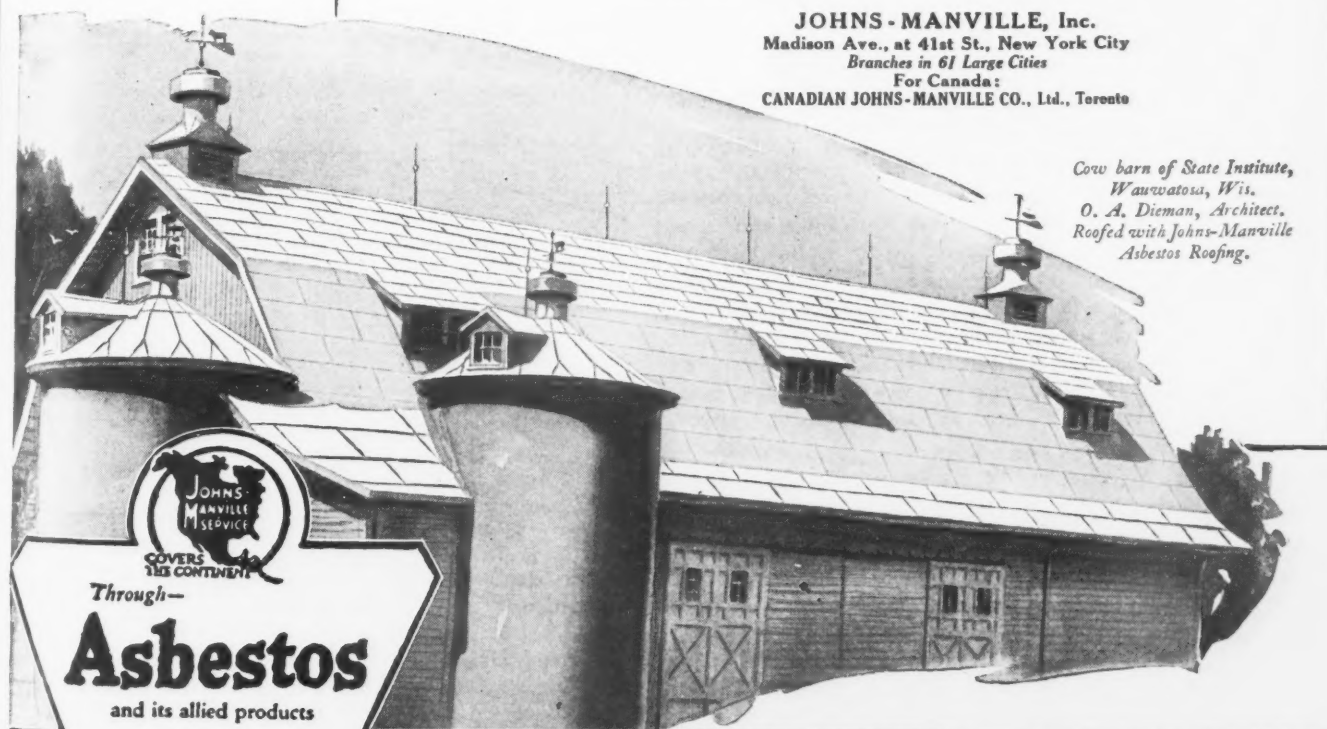
But do you realize that Johns-Manville Asbestos Roofing, because of the service it renders, actually brings in jobs for you. People see it keeping out the weather year after year without the expense of painting or repairs.

Here's what happens—they ask what kind of roofing that is, then they ask who did the job. If you are the man, there's another job practically handed to you.

If you believe it pays to use good materials to do a good job, you'll find Johns-Manville Asbestos Roofing and Siding more than profitable. Ask the nearest Johns-Manville Branch for details about our selling plan.

JOHNS-MANVILLE, Inc.
Madison Ave., at 41st St., New York City
Branches in 61 Large Cities
For Canada:
CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

*Cow barn of State Institute,
Wauwatosa, Wis.
O. A. Dieman, Architect.
Roofed with Johns-Manville
Asbestos Roofing.*



Through—

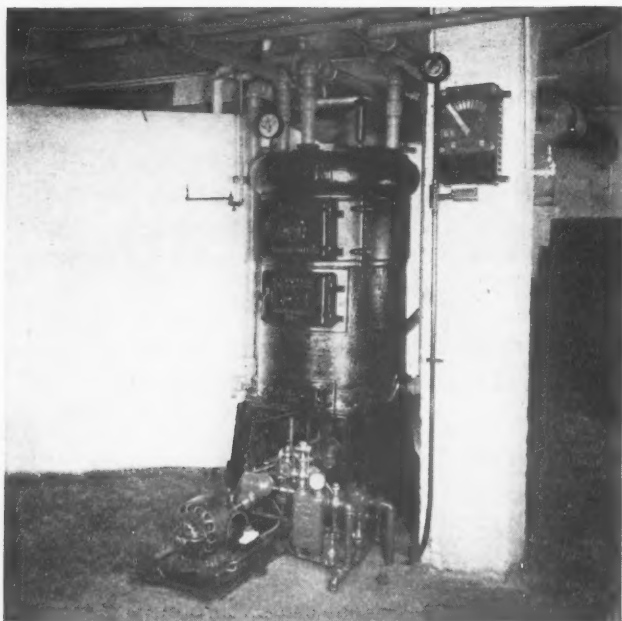
Asbestos

and its allied products

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Serves in Conservation

Heat Insulations, High
Temperature Cements,
Asbestos Roofings,
Packings, Brake
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Products

JOHNS-MANVILLE Asbestos Roofing



Fuel Oil Burner Installed in Modern Hot Water Heating Plant. This Equipment Is Suitable to Heat a Ten to Fifteen-Room House.

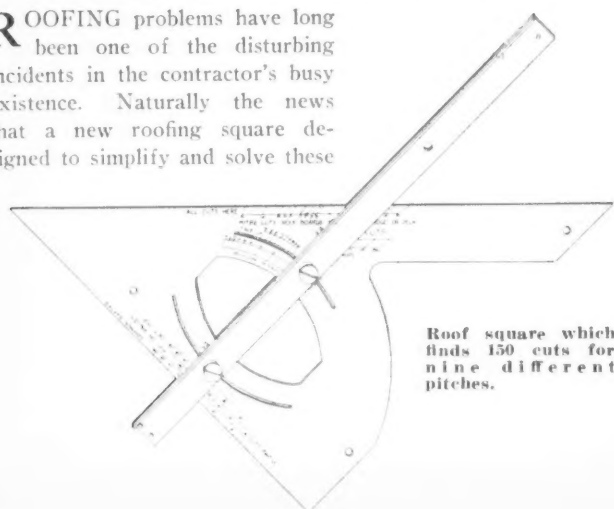
large storage tank under the basement floor or convenient to some filling location. From this larger storage tank it is pumped to a smaller service tank beneath the floor adjacent to the boiler and machine. This two-tank system is the best method of installation because it eliminates all possibility of large pieces of dirt, etc., getting into the service tank. One tank can be used in which case the tank is located directly under the boiler so that it can function as storage and service.

Oil from the service tank is drawn up to the machine by a pump thru a strainer and then is forced into a pressure chamber where it is kept under pressure by the pump. The oil then passes up thru a revolving needle valve which regulates the flow of oil into the burner. The oil then flows down into the bottom of the revolving cup of the atomizer. The whirling process causes the oil, which is the lightest, to come up to the smallest diameter and pass out over the atomizer into the fire box. The dirt and other substances heavier than oil constantly pass off under the oil and are consumed. As the oil leaves the atomizer it is thrown by centrifugal force into the fire box and converted into gas globules which makes the fire. This is lighted by match or paper.



Roofing Square Finds Many Cuts

ROOFING problems have long been one of the disturbing incidents in the contractor's busy existence. Naturally the news that a new roofing square designed to simplify and solve these



problems is now on the market will be of interest to architects, builders, carpenters, and other workers who encounter such problems.

This roofing square which is illustrated herewith gives 150 cuts for nine different pitches, and a book of directions which accompanies the square gives information on finding about 180 other cuts, and also length of rafters. It is designed to find hip or valley jacks and octagon hips up to 30 feet span, also lengths of the sides of polygons from 3 to 12 sides.

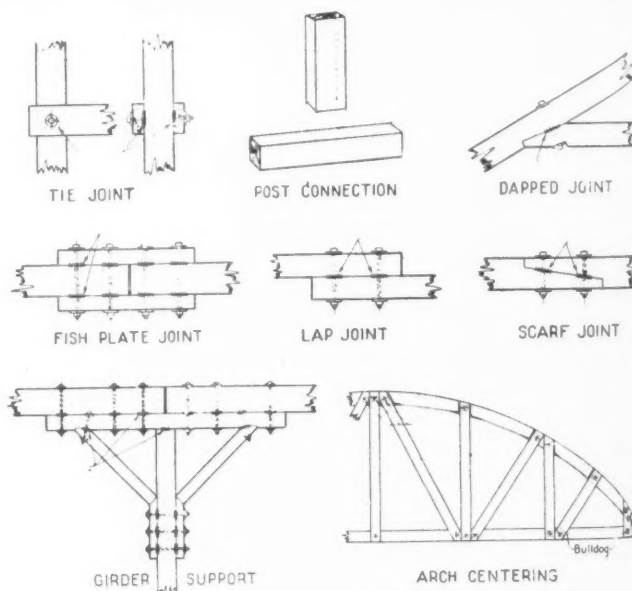
The square is simple to operate so that any practical man can find any cut or pitch from 4 inches or $\frac{1}{4}$ to 18 inches or $\frac{3}{4}$. All cuts are taken on the 45 degree line to the intersection with the slotted stock. Care should be observed to have both slots on the square in knurled bolts parallel to slotted stock. Then point the slot upward as required.

To operate, the knurled nuts are turned and the stock adjusted. Some of the cuts which can be found by using this square are the plumb cuts for common rafters, hips and valleys, bottom or level cut, side cuts, face cuts for roof boards, and backing of hips.



Joint Plate Reduces Timber Construction Costs

JOINING timbers, especially where large tresses occur, is quite a complicated task. An invention of recent date which will be of particular interest to contractors is a joint

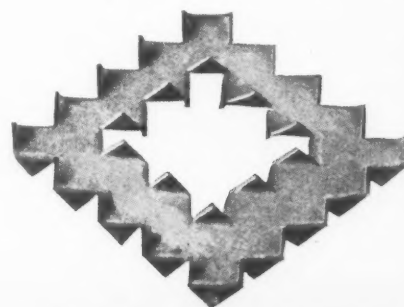


Various Types of Timber Construction in Which Joint Plate Shown Below Can Be Used. Arrows in Diagram Point to Plate.

plate designed to solve much of the trouble in timber construction.

This device is a steel plate provided with a number of sharp teeth on both sides as shown in the illustration. When placed between two wooden members and the joints drawn up tight with the bolt going thru the square hole of the plate, it provides rigidity and strength. As the nut is tightened, the teeth cut into the wood evenly and make a firm connection. The plate

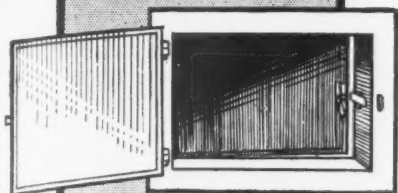
(Continued to page 108.)



Joint Plate for Timber Construction.

DONLEY DEVICES

Modernize the Home



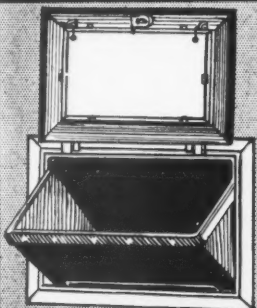
Package Receiver



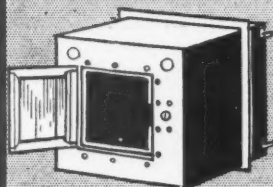
Fireplace Damper



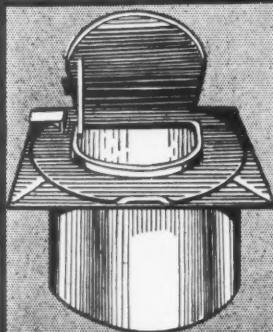
Ash Dumps



Coal Chute



Meter Box



Garbage Receiver



If Women Built Houses

DONLEY DEVICES would be installed without question in every home built and planned by women. Women see, what men sometimes overlook, that the *operating* problems in the home must receive adequate thought when it is planned and built.

Donley Devices win the instant approval of the woman who is to be mistress of the new home. As a means of insuring quick and profitable sales of homes built for investment, they are worth many times their moderate cost. And the satisfaction is such that no woman who has enjoyed their advantages would consider being without them.

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Donley Package Receivers, built in the wall, take the milk, meat and groceries and hold them until removed from within.

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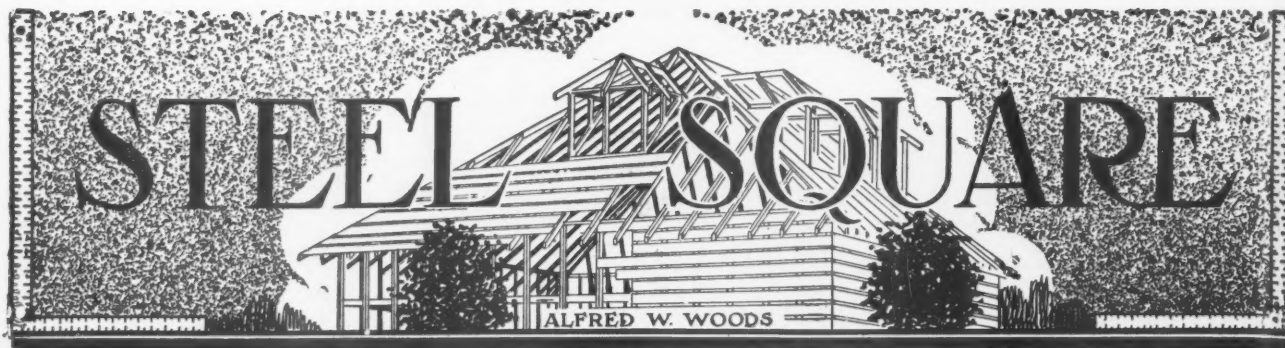
Donley Coal Chutes protect the building from flying chunks of coal. Thief proof. Easily operated.

Donley Meter Boxes, in the basement wall, keep the meter reader outside.

Donley Garbage Receivers end garbage can nuisances.

Write for Donley Catalog

The **DONLEY BROTHERS Co.**
BUILDING SPECIALTIES  7400 AETNARD
CLEVELAND



How to Use the Steel Square

OBTAINING ANGLES ON HIP AND UNEVEN PITCHED ROOF

MANY are the ways of illustrating the applications of the steel square in obtaining angles for roof framing and varied, but we cannot take the time to give them all, or we might better say, have the time, for we know not where the end is. Neither do we believe the readers would care to have us make the attempt. Therefore, we will show but a few more and then pass on to other parts of our subject that promise to yield much under "square treatment."

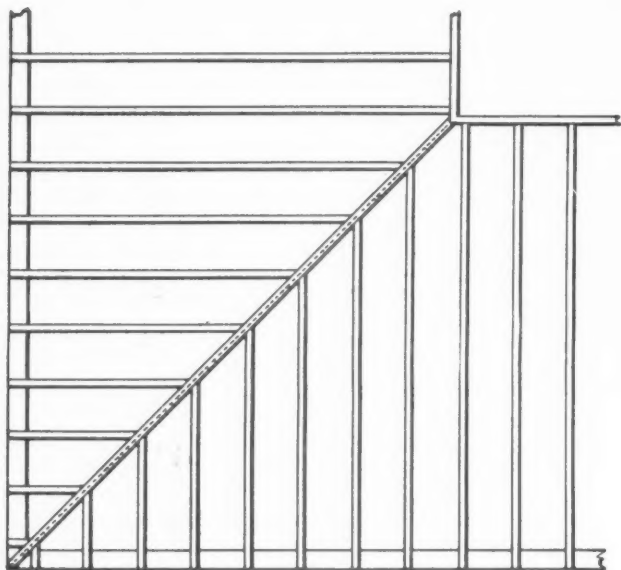


Fig. 1. Plan for Regular Pitched Hip Roof for Square-Cornered Building.

Taking up the subject where we left off last month, of what determines the figures to use on the steel square for equal and unequal pitches and their relation to one another.

In Fig. 1 is shown the plan for a regular pitched hip roof for a square cornered building. In this, it will be seen, the deck plates rest parallel and at equal distance from the wall plate. In Fig. 2 are shown the angles on the squares to obtain the cuts. The pitch being the same on both sides (9-inch rise to the foot), the angles on the squares necessarily show the same for each side.

Note—The heels of all of the squares are resting at a central point on the line of the hip, which is at a

point 12 inches on a line at right angles from the plate from either side, as shown by the squares Nos. 1 and 2. The tongue of the squares Nos. 3 and 4 are resting along the line of the hip and the intersections with the plate lines are at 17 on both the tongue and blade. Twelve and 9 (B C), as shown on the former two squares, give the seat and plumb cuts of the common rafter, while 17 and 9 (A F), as shown on the latter two squares, give the same for the hip. For the side cut of the jack it is 12 and 15 on the square. The side on which the latter is taken giving the cut. The former number is used because it is the length of the tangent. In other words, it is the length of the plate from the corner to the intersection of the tongue (as at A-B) 15 is used because that is the length of the rafter for a 1-foot run (as at B-C) for the 9-inch rise of three-eighth pitch. For the cut of the hip to fit against the corner of the deck plate, which is the same as the angle for the side cut each way, and then sawing only to the center line from both sides; the figures to take on the square are 17 (D-E) and $19\frac{1}{4}$ (A-F). The side on which the latter is taken will give the cut. By a little study of this illustration, we trust why these parts are taken will be made clear and need no further explanation. This is a general rule, that

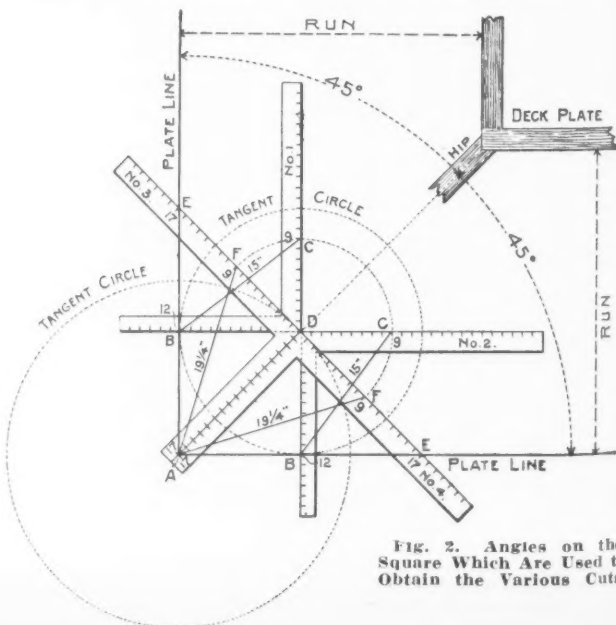


Fig. 2. Angles on the Square Which Are Used to Obtain the Various Cuts.



Complete Set of Drawing Instruments

Yes, I will give you this complete drawing outfit absolutely free. The instruments are in a handsome high class, plush lined folding case. They are regular draftsman's working instruments. Besides I will give you absolutely free, a 20x25 inch drawing board, a 24 inch T square, a 12 inch rule, a supply of drawing paper, two triangles, a French curve, pencils, erasers, thumb tacks, etc. The complete outfit is delivered to you at once. You have them to work with from the very first day. Find out about this offer. Write today.

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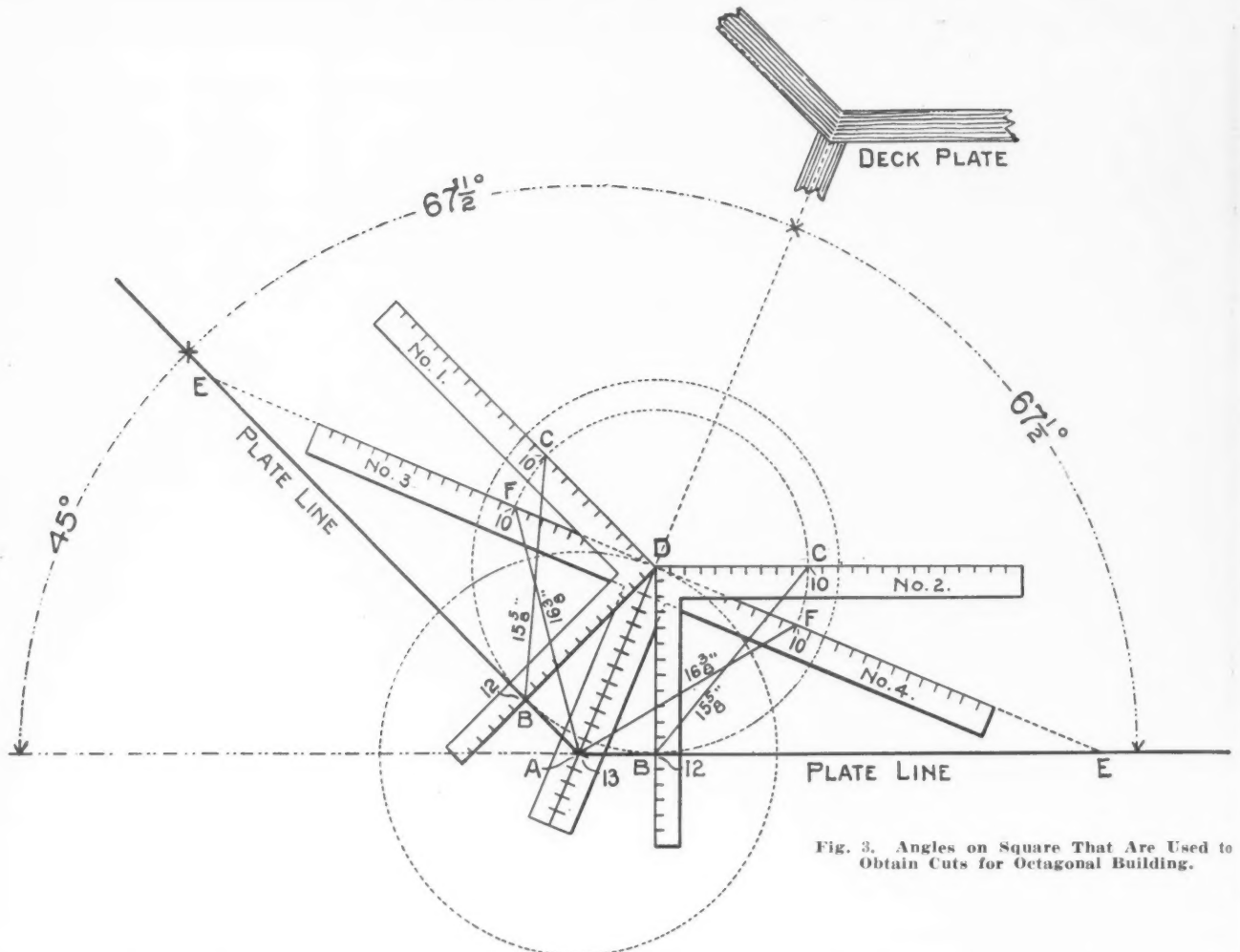


Fig. 3. Angles on Square That Are Used to Obtain Cuts for Octagonal Building.

is, the principle applies to any angle such as the hexagon, octagon or in fact any irregular cornered building.

In Fig. 3 is shown the same treatment for the octagon. Like letters are used to represent the same parts. Therefore, the explanation given in the former applies to the octagon but, of course, the figures to use on the square are changed.

Note—The angle formed by the plates for the square cornered building is 90 degrees, which represents twice the angle that the run of the hip rests from the plate at either side. In the case of the octagon corner, the angle is at 135 degrees and the half of this is $67\frac{1}{2}$ degrees, which represents the angle from the run of the hip to the plate at either side.

We will now apply this same principle to the uneven pitched roof, that is, where one side of the roof is steeper than the other, as shown in Fig. 4. Here is a square cornered building with a run on one side of 8 feet and 10 feet on the other. Problems of this kind can better be illustrated by using the 1-inch scale on the squares. That is, by letting 8 inches on the tongue of No. 1 represent the run of the 8-foot side, and 10 inches on the tongue of No. 2, the 10-foot side, and place their heels on the hip line, as shown, with their blades parallel to the plate lines. Then place the squares, Nos. 3 and 4, with their tongues along the hip line and with heels resting at same point as those of Nos. 1 and 2, the figures on the blades at the intersecting of the plate lines, as at E and the length A F of the respective sides will be the figures to use on the square to obtain the side cuts of the hip. The side on which the latter is taken, giving the cut. For the side cut of the jack for the 10-foot side take 8 (A-B) and $13\frac{1}{2}$ (B-C) on the square. The side on

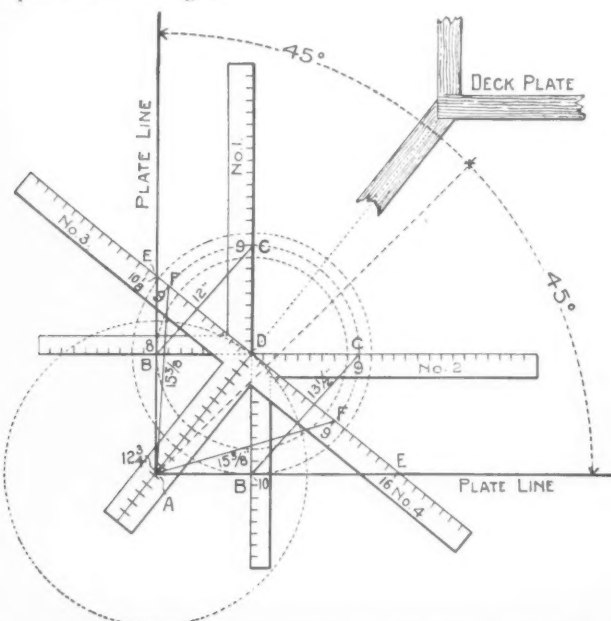


Fig. 4. Angles on Square for Uneven Pitched Roof Where One Side Is Steeper Than the Other.

(Continued to page 104.)



**See your
doctor**

**—about installing a LATTFNER
Automatic Heater in his garage**

Submit your heating problems to us and WRITE FOR BULLETIN 103. It will tell you all about the Lattner and its opportunities for you.

All you've got to do to land this extra profit is to show the doctor how inexpensively and easily he can keep his car in instant starting condition in cold weather and a nice warm garage to change tires, put on chains and make his repairs in.

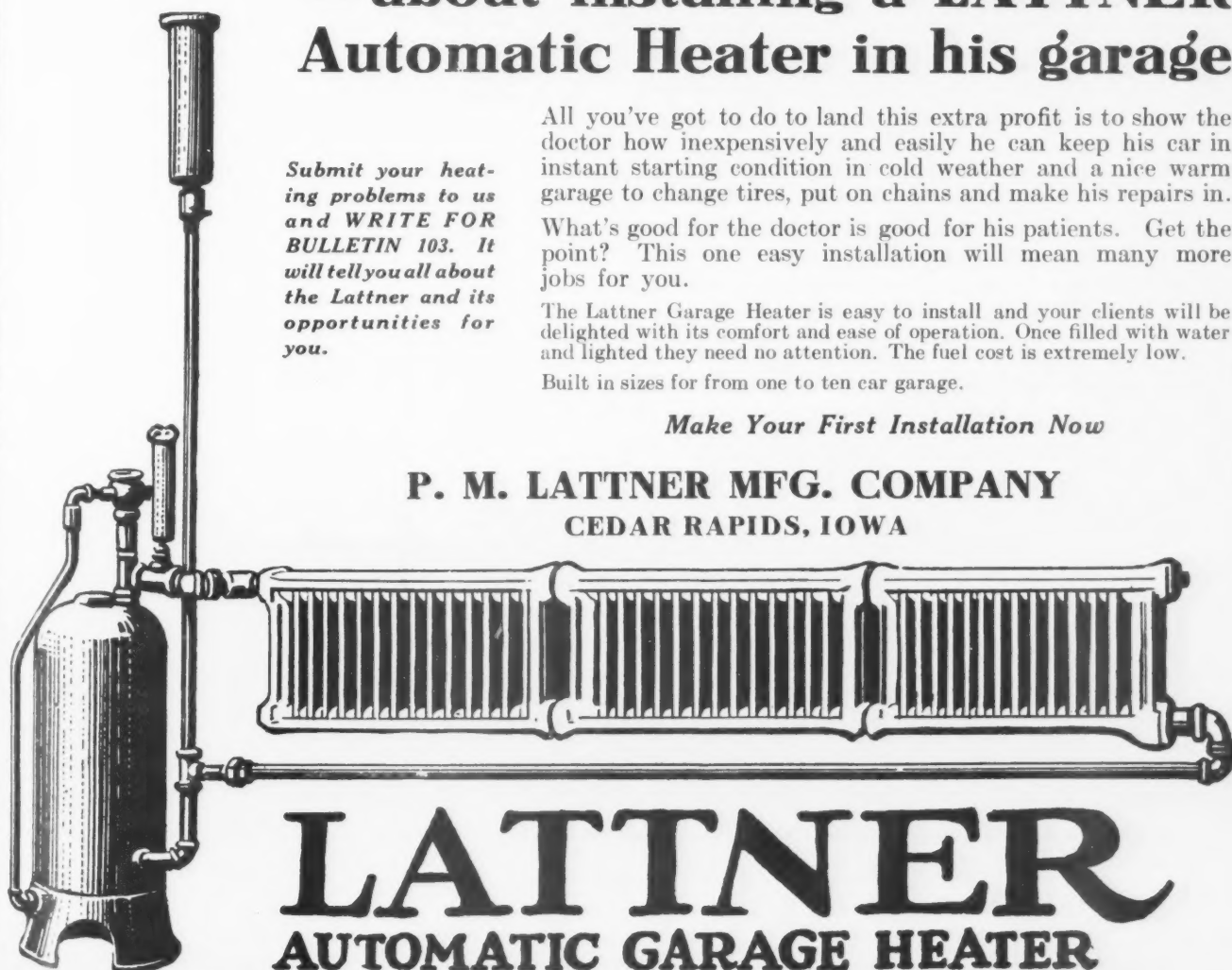
What's good for the doctor is good for his patients. Get the point? This one easy installation will mean many more jobs for you.

The Lattner Garage Heater is easy to install and your clients will be delighted with its comfort and ease of operation. Once filled with water and lighted they need no attention. The fuel cost is extremely low.

Built in sizes for from one to ten car garage.

Make Your First Installation Now

**P. M. LATTFNER MFG. COMPANY
CEDAR RAPIDS, IOWA**



**LATTFNER
AUTOMATIC GARAGE HEATER**

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Increasing Window Area in Schools

STEEL SASH IS NOW USED BY BUILDERS TO PROVIDE MAXIMUM DAYLIGHT TO GROWING PUPILS

NOWHERE is daylight more essential than in our schools. Here we send our children, in the formative period of their lives, to spend the larger portion of the day. Conditions in the classrooms have a tremendous effect in either laying the foundation or destroying hopes of a healthy future.

Medical experiments show conclusively that adenoids, bronchial trouble and tuberculosis are frequently the direct result of poor air in schoolrooms. Poor ventilation has been found the frequent underlying cause of dullness and headaches, and weak eyes are attributed to the lack of sufficient daylight.

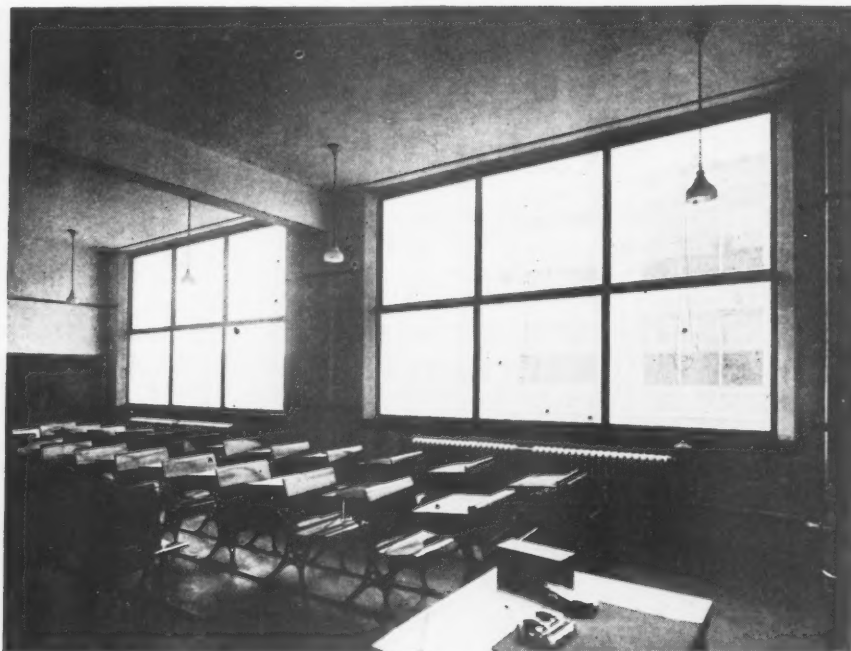
In common with the movement



Steel Sash with Pivoted Ventilators Make This Urbana, Ind., School Quite Attractive and as Modern as Schools in Larger Cities.

Their economy is a strong appeal, too. Their cost depends somewhat upon the quantity ordered.

School buildings demand a wide variety of window types. The requirements of a large metropolitan school are usually quite different from those of a small rural school.



Counterbalanced Steel Sash in Highland Park, Mich., School. This Type Is Used in Large Schools Because of Its Facilities for Shading and Washing.

for better factory conditions and lighter, airier work-rooms, has come a similar movement for better school buildings. Conspicuous among the characteristics that distinguish the modern school from the old-fashioned are the windows. Time was when a few windows were considered sufficient, but today the architect who designs a school building with only eight or ten windows would hardly be classed as progressive.

To answer this present-day requirement for greater window area in schools, builders have turned to steel sash. In addition to providing more daylight and better ventilating facilities than ordinary school windows, steel sash have the advantage of being fire resisting.

And then, in each school, different sections of the building present totally different day-lighting and ventilating problems. The windows that may be proper in the classroom may not be at all the



Balanced Ventilator Type. In This The Sash Are Balanced on Two Arms at the Jamb. They Can Be Reversed Easily for Washing From the Inside.

Steel WindoWall Department

Fenestra Saves \$1,200 on One School and \$500 on Another

A contractor in South Carolina recently reduced his price \$1,200 on one school job, when the wooden sash called for in the specifications were changed to "Fenestra WindoWalls."

On another school, this same contractor allowed a credit of \$500 for the same change in specifications.

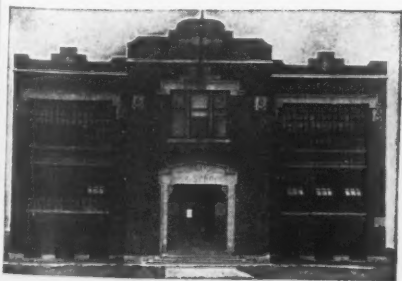
"Considering the cost of mill work, there is a considerable saving in Fenestra as compared to wood sash," this contractor wrote us. "Besides, Fenestra is much more durable and satisfactory."



J. B. Tatum, of Putnam, Conn., secured Fenestra windows for 9 per cent less than the wooden windows which he had originally specified. The total window cost was less than \$100.



On a job of less than \$200 in South Norwalk, Conn., recently, Fenestra was 20 per cent less than the price of wood windows.



A typical "Fenestrated" eight-room school in a middle western town

On a school in Medford, Minnesota, the contractor allowed the school board a credit of \$800 for the use of Fenestra Steel Windows instead of wood. The total steel sash order was for less than \$1,300.



A sash and door manufacturer in Scranton, Pa., asked for a quotation on Fenestra. When he saw the figures, he said:

"Well, we can't make wooden windows for that price."—And he used the Steel WindoWalls.



-At Less Cost Than Wood



FENESTRA Steel WindoWalls are so much better than wooden windows it is amazing that they *Cost Less*.

They are easily handled, (shipped complete—no frames, no fitting, no hanging, no extra hardware.) And they offer so much more light, ventilation and fire protection, that large industries use them as a matter of course.

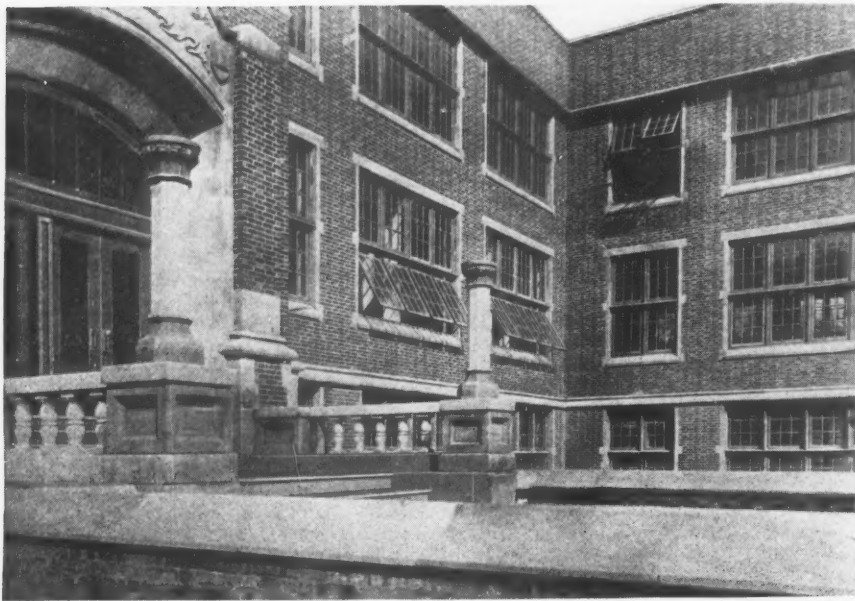
And where their real economy is known, builders are now putting them in schools, stores, creameries, garages, laundries—even the very smallest commercial buildings.

Building supply dealers can always get them quickly from one of our 24 warehouses.

Fenestra
Steel WindoWalls

For particulars, write

Detroit Steel Products Company
2300 East Grand Boulevard, Detroit



Pivoted Sash in Group Windows. The Adjustment of This Sash Permits Ample Ventilation Without Draughts on the Pupils in the Room. Senior and Junior High School, Jacksonville, Ill. J. W. Boyer, Architect, Urbana, Ill.

thing in the gymnasium or auditorium, in the manual training rooms or power house. It is an advantage to school builders that steel sash is manufactured in a variety of types to take care of this demand.

Counterbalanced windows appeal to some builders because they slide up and down and the architectural effect that they produce is often desirable. They have been used frequently in large metropolitan schools because of their facilities for washing and shading. This type of window offers distinct advantages from a daylighting standpoint over counterweighted sash with wide weight boxes and light-obstructing mullions.

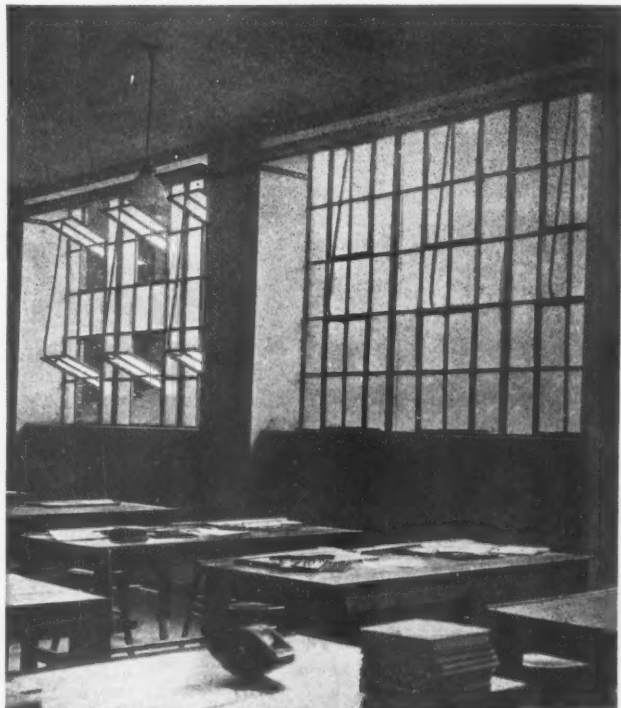
A casement type of sash answers the demand of some architects for the effect of a sash with large glass lights. A single pane of glass is used in the ventilator which is pivoted 4 inches from the top to swing out. The fact that this window can be shaded when the vent is open is regarded as an additional advantage by some architects.

Small glass lights are a big advantage from a maintenance standpoint. Snowballs and rocks, and the small boy, break many school windows and it is easier

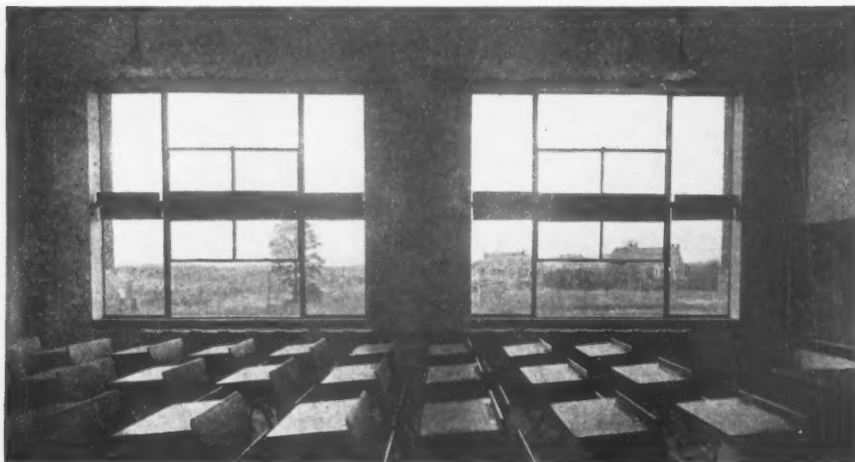
and costs less for the janitor to replace small lights.

The ventilators may be located at the sill, pivoted $\frac{3}{4}$ inch from the bottom to open in. This acts as a windbreak, effectually preventing draughts—a feature of considerable advantage in schoolrooms. The pivoted ventilators may be easily washed from the inside when reversed and the fixed panes can be reached with ease with a short window brush—from the inside. There are a number of satisfactory methods of shading.

Some sash have a balanced ventilator that lowers from the top as it opens, balancing on two arms at the jambs. The ventilators do not



Steel Sash with Pivoted Ventilators and Reinforcing Steel Interior, Academy High School, Erie, Pa.



Recitation Room Fitted with Counterbalanced Steel Sash, Two Narrow and One Wide Panels in Each Window.

project inside, making shading and screening an easy matter. By reversing the ventilator, it can be washed from the inside without stepping on the sill. When desired, the ventilator alone can be shaded or shades can be attached so that when opened, the ventilator acts as an awning. ❀

THERE are two classes of fire-bugs—the person who knowingly sets fire to a building and the person who knowingly builds burnable buildings. Fire-safe construction is the only cure for both evils.

Daylighting Schools

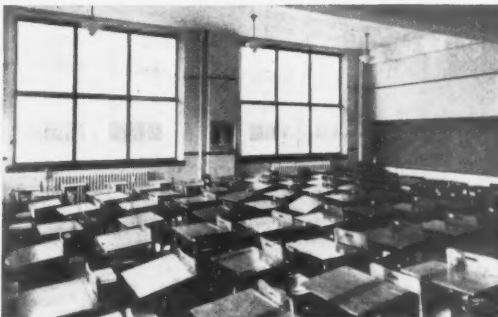
TRUSCON STEEL SASH



More Daylight for the Small School



Kindergarten Protected From Fire



Class Room Flooded With Daylight

Modern schools are built for safety, health and convenience of the students and teachers. There must be no fire hazard; health must be protected through ample ventilation and adequate daylighting. At the same time these buildings must be permanent and economical both to build and maintain, and in harmony with architectural standards of beauty.

Truscon Steel Sash are fire resistant. They afford 40 per cent more daylight than wooden construction, and they always operate easily. Their slender straight lines harmonize with any architectural treatment.

Truscon Steel Sash daylight hundreds of schools, large and small, in every part of the country.

*Actual figures show that
Truscon Steel Sash cost
less than wood.*

In 45 principal cities Truscon Daylight engineers are ready to assist in making designs and layouts for contractors and builders without the slightest obligation.

Write for New Handbook of Steel Sash

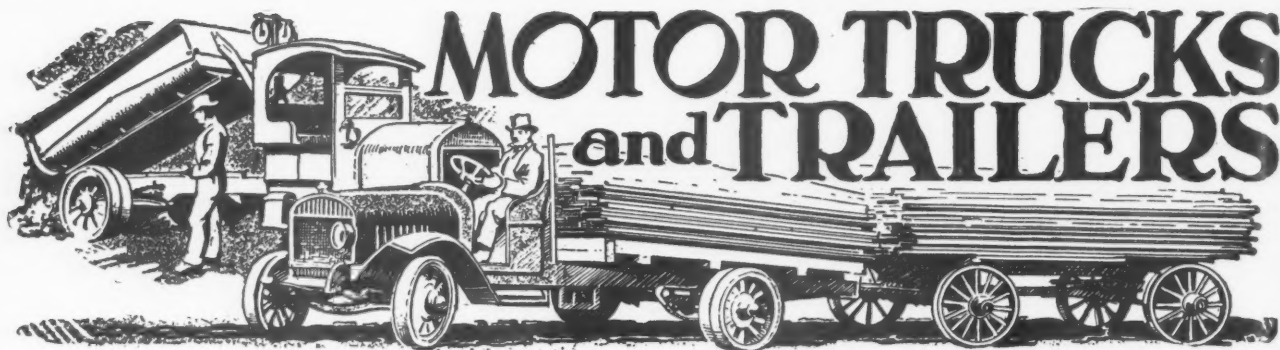
TRUSCON STEEL COMPANY

YOUNGSTOWN, OHIO.

WAREHOUSES AND REPRESENTATIVES IN PRINCIPAL CITIES



Navarre School, Toledo, Ohio—E. M. Gee, Architect, A. Bentley & Son Co., Contractors



Motor Truck in Road Building

HOW TWO 5-TON TRUCKS HELPED TO LAY EIGHT MILES OF GRAVEL ROAD IN CALIFORNIA COUNTY

HAULING gravel from the pits to points along the road is just one phase of the work performed by the 5-ton truck owned by the County of San Luis Obispo, Calif., and another truck of like capacity operated on the same job by John Guy, hauling contractor. When all phases are considered, the effect is to establish the versatility of the motor truck and to define sharply the contrast between old and new in hauling equipment and methods, for struggling along with the powerful motor trucks a few teams of horses are still retained. Their presence affords an unescapable opportunity to literally measure in "horse power" the endurance and capacity for work of the motor truck.

Reduced to figures, the exact superiority of the 5-ton truck over the horse would read something like this, according to Supervisor E. C. Loomis, in charge of road work in San Luis Obispo County:

"Each truck daily made six round trips, averaging 13 miles in length, carrying between $5\frac{1}{2}$ and 6 yards of gravel. Four horses, pulling a wagon and two yards of gravel, made two round trips a day, two teams thus transporting four yards to every 35 hauled and spread by a single motor truck.

"Besides, horses tire quickly. They also consume an enormous amount of feed. Motor trucks are tireless, require little attention and their upkeep cost is negli-

ble when the amount of work they accomplish is considered."

When not engaged in hauling gravel or spreading it along the road, the sturdy trucks are used in pulling machinery or, equipped with 1,500-gallon tank, in sprinkling the road.

The present method of excavating, loading, transporting and spreading gravel by motor truck is estimated to cost two-thirds less than in the days when horses were the sole equipment. Now workmen plow up the tenacious gravel and scrape it within reach of the mechanical loader installed at the side of the gravel bank. A truck can be loaded and started on its way in ten minutes. Arrived at its destination, the truck distributes its load by means of the spreader which is part of its mechanism.

During five months of 1920, eight miles of gravel were laid in San Luis Obispo County.



HAVE you formulated any plan for study during the winter months? Don't waste your valuable time, but use it to get better prepared for next year. Are you anchored to your position in life? We predict you won't be after reading the new cyclopedia on building construction. Write us for complete information.



Two 5-Ton "Whites" on the Job. They Helped Build Eight Miles of Fine Road in San Luis Obispo County, California, in Five Months They Averaged Six Trips Daily Carrying $5\frac{1}{2}$ to 6 Yards of Gravel.



General Motors Trucks

Former Price	\$1995
Reduction	500
New Price	\$1495

At \$1495—a cut of \$500—GMC Model K-16, One Ton Truck, is undoubtedly the biggest dollar for dollar value in the history of the truck industry.

We not only feel that way, but we can prove it by a comparison part by part with other one ton trucks, and by the records of economical operation and long life.

While this truck is a better truck than it ever was, it has been brought to a popular price. Add to this its low operating cost in city delivery, farm work, bus service and for police and fire patrol and you can get a conception of its remarkable dollar for dollar value.

Here is a one ton truck built from the ground up of real truck parts. There's not a passenger car part in it.

Electric lights, starter, and cord tires are standard equipment. It has removable Cylinder Walls, Removable Valve Lifter Assemblies, Dual Cooling, Super-heated Carburetion, Centrifugal Fly-ball Governor and many other distinctly GMC features.

See dealers for further details and for price reductions on all other GMC models.

GENERAL MOTORS TRUCK COMPANY

Division of General Motors Corporation

PONTIAC, MICHIGAN

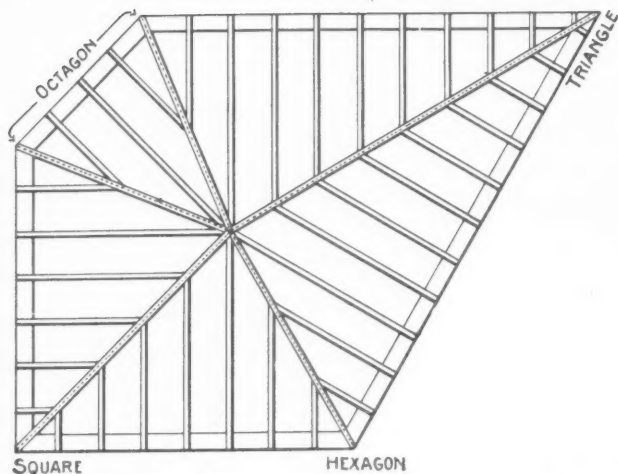


Fig. 5. Number of Angles Combined in One Plan. This Is Very Unusual Type of Roof.

Use of Steel Square

(Continued from page 96.)

which the latter is taken will give the cut. Proceed in the same manner for the other side, but note while we have used the same reference letters for like parts, the figures to use on the square are necessarily different because the run is shorter. It is understood that the run and rise, as shown on the respective squares, give the seat and plumb cuts and needs no further explanation here.

One thing in favor of the inch scale is that the lengths of the rafters are found by simply measuring

the diagonal lines shown across the squares that represent the rafters. But we hear someone say, "Why show all these squares and lines for what might be illustrated in a more simple form?" It is true, it might be, but the object in these illustrations is to show each angle on the square as required in its relative position, and thus step by step show why these parts are taken on the square to obtain the cuts for any angled building.

In Fig. 5 is shown a number of angles combined in one plan. It is not expected that a carpenter would be called on once in a lifetime to frame a roof of this kind, but odd corners are liable to come up in otherwise common work, and when the true principle is understood, there is no reason why any angle could not be as readily framed as for the common square cornered building, because the proportions to take on the square may be arrived at in the very same manner.

One thing that should be remembered in all roofs is that the jacks and common rafters should rest at right angles from the plate, as shown in the plan, otherwise the backs of the rafters will not lie in plane with the roof. In the case of circle roofs, the rafters run to a common center, which is the same as at right angles to a tangent to the circle. Twice in our experience we have known carpenters in framing the rafters for a circular cornered porch try to form the roof by framing jacks to a central rafter, when they should

PLAN FOR A Gurney REFRIGERATOR

Make a place in your kitchen or pantry plans for a Gurney refrigerator and then install it for outside icing. This method is becoming very popular with home owners because of its great convenience.

With the old-style icebox the kitchen floor is inevitably soiled by the dripping ice and muddy feet of the iceman. With a GURNEY the refrigerator can be iced from the back porch without a bit of annoyance to anyone.

All GURNEY refrigerators can be supplied with end or rear icing if ordered.

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and get all the details of this high-class refrigerator. This book illustrates and describes the method for installing the outside icing feature.

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Carey roll roofings are ideal for covering or for re-roofing garages, warehouses, storage sheds or farm buildings used for purposes that do not justify a large expenditure.

These ready roofings are made in smooth finished styles and also with rough, fire-resisting, mineral surfaces. Most styles are made in light weight for short term buildings, and in medium, heavy, and extra heavy weights for more permanent buildings.

They are manufactured on the basis of quantity production in one of the largest roofing plants in the country. Costs are further reduced because all the felt is manufactured right in the Carey mills and the asphalt is refined for perfect adaptation to the felt right at the Carey factory.

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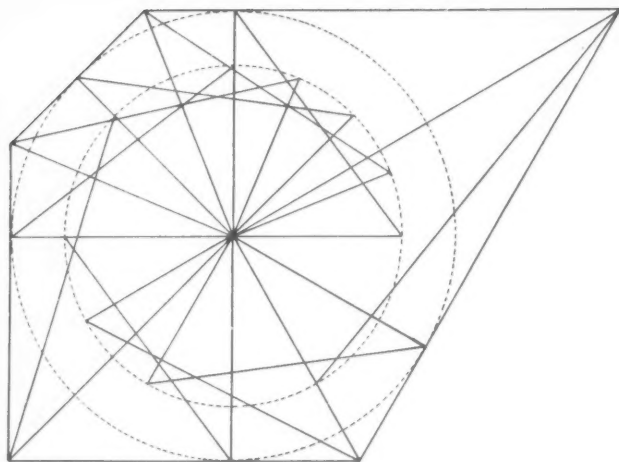


Fig. 6. Simple Layout of the Hips and Common Rafter for Above Plan.

all have been common rafters radiating to a central point. They knew better when their attention was called to it, but they did not stop to think.

Figure 6 represents a simple layout of the hips and common rafter for the above plan. The large dotted circle shows that the central point is at equal distance from the different sides. The inner circle represents the rise circle because, if the rafters were lying down in their relative positions, this circle would catch all of the points at the upper end. In this, all of the common rafters, of which there is one for each side, are of like dimensions. Now, if we could catch hold of these

rafters and raise them up, they would rest over the central point and consequently the rafters would all rest in their proper place.

We will close for this time, but we did not get to say all we wanted to, so will come back next month with a continuation and then—well, wait and see.



Present Area of National Forests

THE net increase in the area of the national forests during the fiscal year ending June 30, 1921, was 2,098,353 acres including 654,942 acres previously purchased but not given the formal status of national forests until proclaimed as such during the present fiscal year.

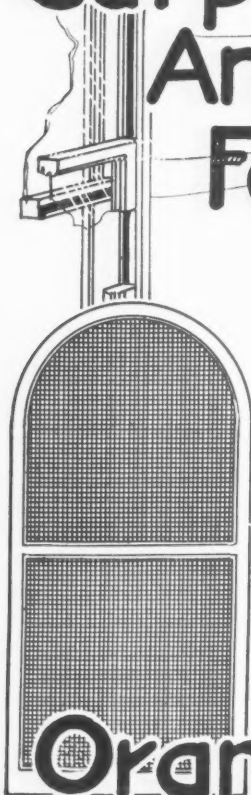
Following are figures of gross and net areas of the national forests, the gross areas including all lands within the national forest boundaries and the net areas excluding alienated lands:

	Fiscal year just ended Acres	A year ago Acres	Increase Acres
Gross area	180,299,776	174,261,393	6,038,383
Net area	156,032,053	153,933,700	2,098,353

The gain made the last year was due principally to the addition by act of Congress of about 1,000,000 acres embracing the Thunder Mountain region in Idaho and Payette national forests. Numerous other measures now before Congress would materially increase this acreage if enacted into law.

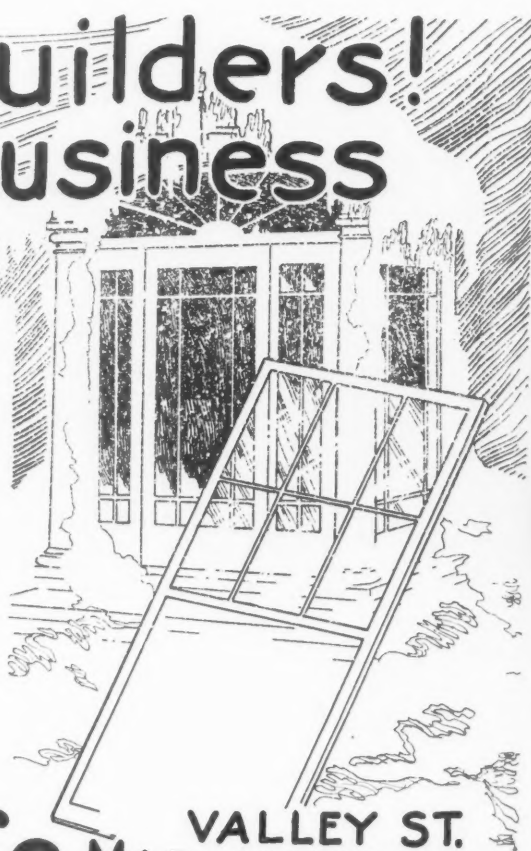
Altho the original program of acquisition included the purchase of 1,000,000 acres in the White Mountains and not less than 5,000,000 acres in the southern Appalachians, the virtual exhaustion of appropriations prevented acquiring any considerable area of new forest land in the East.

Carpenters!—Builders! An All Year Business For You—



BIGGER Profits—Better Business—Steady Income—Furnishing needed ORSCO products to the homes in your community. Every house a prospect that will materialize thru our proven plan of advertising and solicitation. One sale creates another for the comfort and convenience of the customers causes them to create a desire by others in the neighborhood.

Get in line for your territory before another progressive carpenter or builder beats you to it. No competition as we allow only one man in each city to sell ORSCO products. Write for Booklet outlining proposition. It does not obligate you in any particular.



Orange Screen Co. VALLEY ST. MAPLEWOOD, N.J.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

How To Make This A Profitable Winter

Start right now to line up Sheetrock jobs for this winter: walling and ceiling furnace rooms, vegetable cellars and garages; finishing off attics and spare rooms; remodeling stores, hotels, restaurants, theatres and offices.

Sheetrock is made from rock. It cannot warp. It cannot shrink or buckle. It is fireproof. It saves fuel.

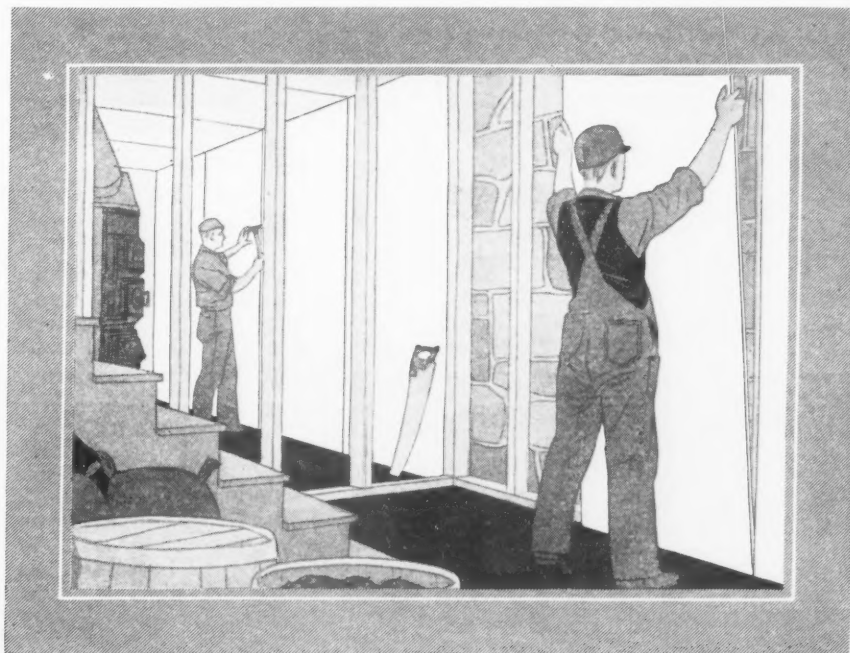
Due to the special U. S. G. process, Sheetrock can be sawed and nailed like lumber. It is quickly and easily

put up. You don't have to wait for the building to dry out.

Sheetrock takes any decoration. It can be papered. It can be painted or calcimined. The new Sheetrock finisher prevents discoloration showing through the decoration and conceals the joints and nail heads.

Cut out and mail the attached coupon for a sample of Sheetrock and our plan to help you get Sheetrock jobs. Do it today.

Sheetrock comes in standard sizes: $\frac{3}{8}$ inch thick, 32 or 48 inches wide and 6 to 10 feet long



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UNITED STATES GYPSUM COMPANY
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Tell me about your Sheetrock plan of sales co-operation

Name _____

Address _____

Design of Safe Construction

(Continued from page 77.)

is now constructed starting from the right end.

The values of the stresses are found and tabulated with the dead load stresses of Fig. 1. The second and fifth columns are then combined to find the maximum stress in each member from the loading of Fig. 3.

The reader may now find the greatest stress that occurs in each of the truss members by taking the largest value found in either the fourth and sixth columns for each particular member.

As I said before, I do not claim accuracy for these results. I am simply trying to illustrate the method for such cases. The reader will find it to his advantage to assume a truss and loads, and make the drawings and calculations for himself.

A reader of the AMERICAN BUILDER has sent in some types of trusses used in barn construction, and suggested that these be analyzed in future articles. This I shall attempt to do.



Believe

BELIEVE in yourself. You must be the builder of your life. The dreams you dream and visions you see shall be realized if you will make the resolution pay the cost, do the work and keep straight onward toward your purpose. Believe in yourself.—*Simpson Lumber.*

What's New

(Continued from page 92.)

is practically buried in the wood in order to prevent any loosening of the members.

This device has already been used in the construction of truss bridges, scaffolds and beams for factory buildings and dwellings. It has been made in simple form so that a common laborer can place it. The normal size is 4 by with 56 teeth, 28 pointing on each side. Standard bolts from 1/2 to 1 1/2 inches in diameter are used to make a connection. This device is also designed to eliminate mortising on the job. The drawings show various types of work in which this steel plate is used.



The Wrong Guess

ONE morning an old man was busy in the back yard with a saw and hatchet when the next door neighbor came to inquire after the health of his wife. The wife, it seems, had taken a severe cold.

"Good mornin', Mr. Smith," said the neighbor; "how is Mrs. Smith this mornin'?"

"Just about the same," answered old Mr. Smith. "She didn't sleep very well last night."

"Poor dear," said the neighbor, sympathetically; "I s'pose that's her coughin', ain't it?"

"No, it ain't her coffin," said Mr. Smith, keeping his eyes on his work. "It's a new hen house."



New Manager for Blaw-Knox

H. O. DAVIDSON is now in entire charge of the Prudential section building department of the Blaw-Knox Company and is general manager of the C. D. Pruden plant of the Blaw-Knox Company at Baltimore, Md. Mr. Davidson was general manager of the Hydraulic Steelcraft Company for eight years.

SAGER METAL WEATHER STRIPS

THE TEST of actual service month after month, year after year, by thousands of users everywhere, is a selling argument that's as sound as the Rock of Gibraltar. Products are like men—their value can be proved only by service.

SAGER equipment has stood the test where others failed and is growing more popular every day.

REPUTATION is worth everything in the product you buy because it is the equivalent of an insurance policy protecting your investment.

THE ACTUAL REASON behind popularity is nothing more or less than the concrete proof the product has delivered the goods.

Popularity is the public's PERSONAL RECOMMENDATION

Some good territory open for live agents

SAGER LOCK COMPANY

NORTH CHICAGO

(Established 1880)

ILLINOIS

What You
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Should Know
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Building.

What You
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About Heat-
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What You
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About Water
Supply and
Drainage.

What You
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About Plas-
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About Sheet
Metal Work.

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the Cost of a Build-
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Successful
Building Su-
perintendent

What You
Should Know
About Con-
tracts and
Legal Rela-
tions.

How to Know
Material and
Select the
Best.

How to Write
and Read
Building
Specifications

How to Read
Blueprints
and Plans.

A Thousand Things You Ought to Know

EVERY day in your work you get up-against new problems—sometimes it is only some old "sticker" coming in a new way. Just the same though it takes a lot of time to figure them out. **Don't do it.** Here's everything worked out for you. Every problem big or little that you will meet in a day's work. Hundreds of new ideas and better ways of doing things. Hundreds of ways the other fellows are making money. Hundreds of ways you can make more out of the same work you are doing now.

Cyclopedia of Carpentry and Contracting

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Please send me the 5 volume Cyclopedia of Carpentry and Contracting, shipping charges collect. I will send you \$2.80 in seven days and \$3.00 each month until \$24.80 is paid or notify you to send for the books at your expense. If I buy the books I get a membership in your society free.

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1000 Better
Ways of Do-
ing Things

How to Care
for Tools.

the cavity. The twelve-inch Ideal wall is more than doubly safeguarded, for not only does this wall possess two hollow spaces in which air is slowly circulating, but there is no material in direct contact from front to back of the wall.

For the reasons stated it is not necessary to furr and lath the inside of even an eight-inch wall except in locations having very severe and long continued winter, as in the Dakotas or northern Minnesota. In ordinary climates the eight-inch wall can be safely plastered directly upon the brick. In the extremely cold climates mentioned, the eight-inch furred, or the twelve-inch unfurred wall should be used.

The economy and safety of plastering directly on the brick, and the damp resistive qualities of the Ideal wall are not matters of speculation but have been thoroly proved in actual practice, for altho the Ideal wall was developed independently a few months ago the publication of the principles of its construction have brought to light its previous sporadic employment not only in this country but abroad, and in every instance it has proved entirely satisfactory. To give only a few instances:

In the semi-tropical climate of Fukien, South China, Ideal walls have been used for centuries. Modern mission buildings there have been constructed with Ideal walls, "always with good results," says the Fukien Construction Bureau of Foochow.

In the bitterly cold climate of Sweden an Ideal wall bungalow plastered inside directly on the brick, has been occupied constantly since 1880 and "has always proved warm and comfortable," says the Director of the Swedish Brickmakers' School of Experimental Brickwork.

"This wall worked out so well that we adopted it for all of our residence construction," says a Tucson, Ariz., homebuilder.

Used for an entire group of houses at Phillipsburg, N. J., "the Ideal wall is a great success," says Paul R. Smith, the architect.

In the neighborhood of Los Angeles, Calif., four or five hundred Ideal wall homes are housing their occupants comfortably.

Altho the Ideal wall has been brought to the fore only within recent months, it is already being widely used, and is proving to be a valuable aid to home builders everywhere in providing substantial homes at a low cost.



The Seventh Annual Catalog of "Hard-to-get" Materials has been issued by the Manual Training Supply Co., Anoka, Minn. It shows a varied line of accessories for the cabinet maker and carpenter such as built-up furniture, upholstery, fittings, cedar chest hardware, etc.

"Emperor" Furnaces are described and illustrated in Catalog No. 103 just issued by the Bergstrom Stove Co., Neenah, Wis.

Carpenters—Contractors Increase Your Incomes

Here's an opportunity for the carpenter who is tired of working for a wage or the contractor who wants to increase his income.

Become an Allmetal Weatherstrip Contractor-Agent

Sell and install Allmetal Weatherstrip. There is big money in it. It is a new and uncrowded field and we want a contractor-agent in every locality to look after our business. Every home, public institution, office building, etc., erected or in the process of being built is a prospect.



Earn \$5,000 Per Year

Many of our agents are making \$5,000 per year. They are independent—happy in a business of their own. Weatherstrip is easy to sell and easy to install. Now is the time to interest owners of old buildings and the time to get under way for the building boom that is bound to come.

Send for Our Selling Plan

We teach you how to install Allmetal and assist you to land contracts. Send for our plan. It will not obligate you in the least and it may be the means of a nice income this winter should work be slack. Write today.

ALLMETAL WEATHERSTRIP CO. 124 WEST KINZIE STREET
CHICAGO

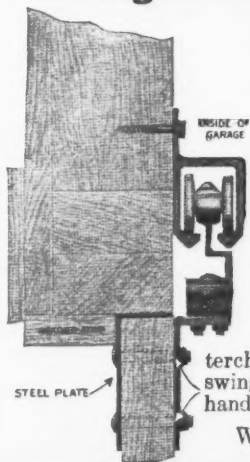
WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

PORTER

"Dependable Since Sixty-Eight"

Here are a few of the items from the big 144-page Porter catalog that will particularly interest you as a contractor or builder—items that you will personally have occasion to buy or specify. On other Porter products—barn equipment, hay tools, door hangers, etc., you will want to be posted so you can advise your clients intelligently. We will gladly mail complete catalog on request.

"Straight-Away" Garage Set



The "STRAIGHT-AWAY" Garage Door Set is complete—track, hangers, latches, handles, hinges, bolts and screws. Installation is a one-man job; hammer and screw driver are the only tools needed.

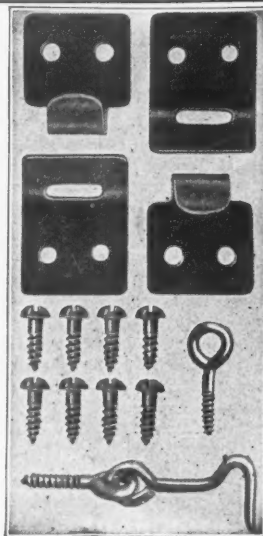
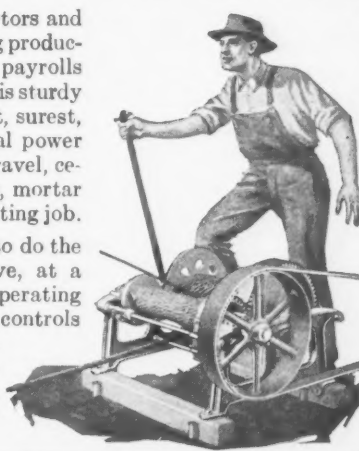
Track is on the inside, out of the weather. Roller bearing trolleys always roll smoothly and easily in the Porter Double-V Track. Patented offset swivel permits the use of straight track; doors always fit snugly. Hardware is interchangeable to allow doors to swing in or out, right hand or left hand.

WRITE FOR COMPLETE FOLDER

Single Lever Friction Hoist

Hundreds of contractors and builders are speeding production and reducing payrolls through the use of this sturdy hoist—the cheapest, surest, and most economical power for handling sand, gravel, cement, earth, lumber, mortar—or for any other lifting job.

It enables one man to do the work of four or five, at a remarkably low operating cost. A single lever controls both drums, an exclusive and valuable Porter feature. Ask for complete description and prices.



The Finishing Touch

When you build a home, complete the job by equipping it with this convenient inexpensive window screen and storm sash set. Each set consists of hinges, screws, hook and screw eye. Permits the hanging or removing of window screens or storm sash in a few moments. Allows them to swing out to an angle of 45 degrees without detaching, when windows are to be washed.

This is a small Porter item with a big value. Tell your patrons about it.



Porter Barn Equipment

The Porter line of equipment includes everything a farmer needs to make his barn modern, convenient, sanitary and profitable. It is simple and practical in construction—absolutely free from fads and unessential attachments.

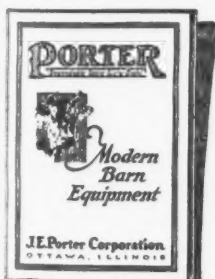
Although it is fit for the finest show barn, it is built first of all for the men who are dairying for profit—the kind of men for whom you build.

It will be helpful to you to know the Porter line and to be able to explain it to those who ask you about it.

CATALOG ON REQUEST

J. E. Porter Corporation, 754 Guion Street, Ottawa, Ill.

Minneapolis Office: 426-A Washington Avenue N.



Get The Porter Catalog of
complete modern barn equipment, including:

Steel Stalls and Stanchions	Hay Tools
Steel Animal Pens	Barn Door Hangers
Drinking Bowls	Garage Door Sets
Litter and Feed Carriers	Hardware Specialties

Gentlemen: Please send details of

- ☐ "STRAIGHT-AWAY" Garage Set.
☐ Single lever friction hoist.
☐ Window Screen hinge set.
☐ Porter barn plan service.
☐ Complete General Catalog.

NAME

ADDRESS

How to Slake Lime

THE American Society for Testing Materials has drawn up a set of directions for slaking lime. It sometimes happens that a new man on the job will ruin a good batch of lime by burning or drowning it. Such conditions should not occur, and if he could be given some simple instructions as to a practical way of determining how much water to use, and how to use it, he could follow them and make the best use of the materials.

The following general directions, prepared by the committee, apply to lime in general, and will prove invaluable to the builder. They may need to be varied to meet special conditions, and actual experience is a better guide than fixed rules.

"(a) Introduction.—Different kinds of lime vary considerably in the way in which they behave with water. A little supervision over the operation of slaking will amply pay for itself by insuring the production of the greatest possible quantity, and the best possible quality, of putty. To find out how to slake a new lot of lime, it is safest to try a little of it and see how it works. Since different lots of the same brand of lime vary somewhat, and since the weather conditions at the time have a decided influence, it is wise to try a sample from each lot used, whether you are familiar with the brand or not.

"(b) Classification of Limes.—In a bucket put two or three lumps of lime about the size of your fist, or, in the case of granular lime, an equivalent amount. Add enough water to just barely cover the lime, and note how long it takes for slaking to begin. Slaking has begun when pieces split off from the lumps or when the lumps crumble. For the test, use water of the same temperature that will be used on the job.

"If slaking begins in less than five minutes, the lime is quick-slaking; from five to thirty minutes, medium slaking; over thirty minutes, slow-slaking.

Directions for Slaking

"(c) For quick-slaking lime, always add the lime to the water, not the water to the lime. Have enough water at first to cover all the lime completely. Have a plentiful supply of water available for immediate use—a hose throwing a good stream, if possible. Watch the lime constantly. At the slightest appearance of escaping steam, hoe thoroughly and quickly, and add enough water to stop it. Do not be afraid of using too much water with this kind of lime.

"For medium-slaking lime, add the water to the lime. Add enough water so that the lime is about half submerged. Hoe occasionally if steam starts to escape. Add a little water now and then if necessary to prevent the putty from becoming dry and crumbly. Be careful not to add any more water than required, and not too much at a time.

"For slow-slaking lime, add enough water to the lime to moisten it thoroly. Let it alone until the reaction has started. Cautiously add more water, a little at a time, taking care that the mass is not cooled by the fresh water. Do not hoe until the slaking is practically complete. If the weather is very cold, it is preferable to use hot water, but if this is not available, the mortar box may be covered in some way to keep the heat in."



Austin Opens Canada Factory

THE Austin Machinery Corporation announces that the Canadian Austin Machinery, Limited, Woodstock, Ont., incorporated under the laws of Canada will act as sole manufacturers and distributors in Canada of the complete Austin line of earth-moving and concrete-mixing equipment.



NO other country in Europe has such a large percentage (53.56 per cent) of its area covered with forests or such a large area of forests per capita as Finland.

CONTRACTORS AND BUILDERS — INSTALL A HARDIN-LAVIN PIPELESS FURNACE IN YOUR NEXT BUILDING

Our Pipeless Furnaces are Superior Because —

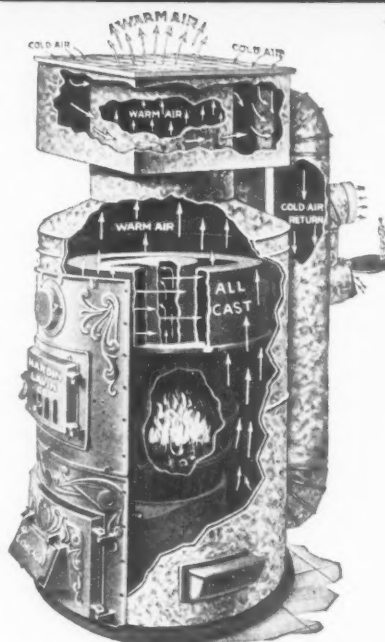
The interior and large front are all heavy cast.

Long circular fire travel saves fuel.

Improved air cleaning humidifier eliminates dust.

Reinforced dumping grates, burns hard coal, soft coal or wood economically.

Has adjustable throat to fit any basement.



Our Improved Pipeless Furnaces "Beat Them All"

Other furnaces take the cold air down inside an outer casing. Notice we take the cold air down through two large separate cold air ducts outside of casing at rear of furnace. This distinctly better method of cold air circulation prevents back draft, warped casings, dust in your home, etc.

SPECIAL ATTRACTIVE PRICES TO BUILDERS

Send today for our pipe and Pipeless Furnace Catalog

\$500,000 PLANTS BEHIND OUR GUARANTEE

SEE OUR FULL PAGE ADV. ON PAGE 170

HARDIN-LAVIN CO. 50 Years at 4522-34 F Cottage Grove Ave., CHICAGO

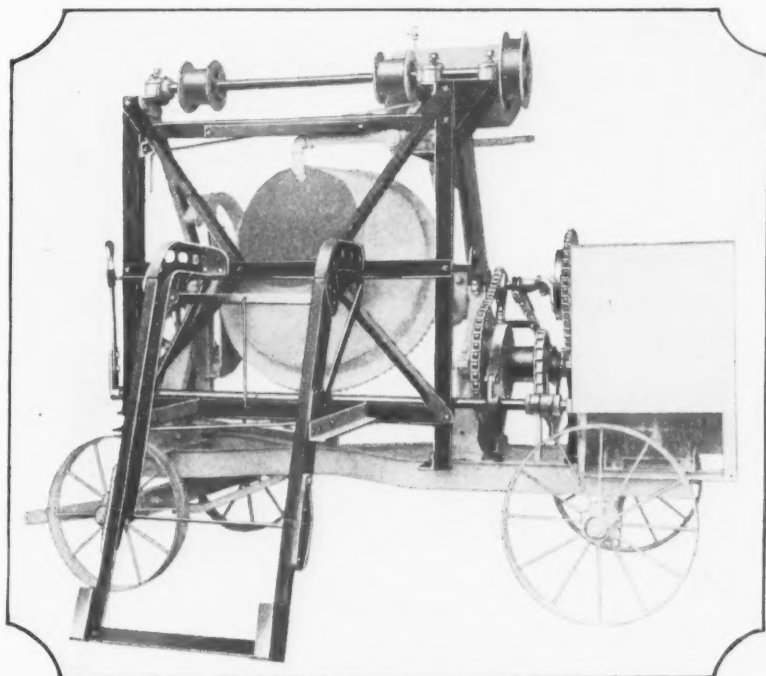
The SUPERIOR POWER CHARGER of a **WANDER** MIXER

Note Its Sturdy Simplicity

*Heavy angle framing
built into the under-
structure*

*Oversize shaft and
bearings*

*Folding legs—stiff
when in position, re-
lieving all strain to
the superstructure,
skids and axle bear-
ings. Folds as illus-
trated for moving*



Showing loader—bucket removed.

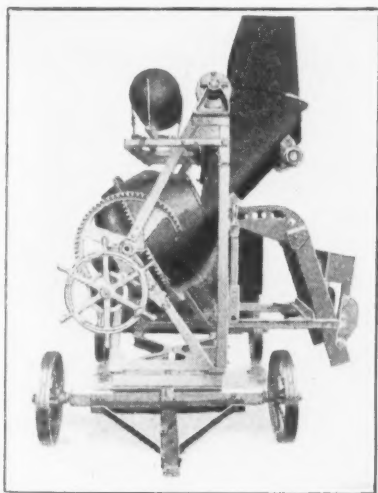
*Liberal use of batter
bracing, cross mem-
bers and heavy gus-
set plate*

*Efficient and accessi-
ble hoist and clutch
assembly*

*Track design—easily
extended to any
depth you wish a
stock pile*

GROUND CHARGING

is possible only with a power loader. Any mixer that must be loaded from a platform is NOT a low charging one. Some platforms may be lower than others but the mixer that can be charged AT THE GROUND LEVEL is one with a LOADER.



Showing legs
folded and bucket
raised for mov-
ing.

The **WANDER** track loader saves time because the travel is so short, and because, requiring much less power, can be run faster with the same engine than other types. This gives MORE BATCHES PER HOUR allowing same time for mixing.

Ask for Catalog M-33.



Mixer raised—
track extended to
charge mixer on
same level with
material piles.



CONSTRUCTION MACHINERY COMPANY

Formerly Waterloo Cement Machinery Corporation

103 VINTON STREET

WATERLOO, IOWA

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of AMERICAN BUILDER, published monthly at Chicago, Ill., for October, 1921. State of Illinois, County of Cook—ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared E. L. Hatfield, who, having been duly sworn according to law, deposes and says that he is the general manager of the AMERICAN BUILDER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Carpenter & Builder Co., Chicago, Ill.; editor, Wm. A. Radford, Chicago, Ill.; managing editor, Bernard L. Johnson, Chicago, Ill.; business manager, E. L. Hatfield, Chicago, Ill.

2. That the owners (give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): American Carpenter & Builder Co., Chicago, Ill.; Wm. A. Radford, Chicago, Ill.; H. M. Radford, Chicago, Ill.; Roland D. Radford, Chicago, Ill.; Wm. A. Radford, Jr., Chicago, Ill.; E. L. Hatfield, Chicago, Ill.; G. W. Ashby, Berwyn, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are (if there are none, so state): None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, associate, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (this information is required from daily publications only).

E. L. HATFIELD,
Business Manager.

Sworn to and subscribed before me this 5th day of October, 1921.

ANDREW JOHN NAUMANN,

[SEAL]

(My commission expires October 23, 1921.)

Chain Belt Opens Buffalo Office

THE Chain Belt Company, Milwaukee, Wisconsin, has opened offices at 735 Ellicott Square, Buffalo, N. Y., and have announced the appointment of T. E. Cocker as district

manager of that territory. Mr. Cocker will handle the Rex line, including chain, sprocket wheels, traveling water screens, elevators and conveyors.

For the past five years Mr. Cocker has been handling elevating and conveying equipment. He is a graduate of the Rensselaer Polytechnic Institute at Troy, N. Y., class of 1907 Civil Engineering. From 1907 to 1917 he was connected with the New York Central Railroad at Buffalo, and at the time he left this company was assistant engineer.



Cleveland Plans Big Building Exposition

ON January 4-14, inclusive, the American Building Show will be staged in the new \$5,000,000 Cleveland municipal auditorium. It is sponsored by the Builders' Exchange of Cleveland.

Stimulation of building interest for the coming spring build-



Chapman & Fraser, Architects, Boston

Cabot's Creosote Stains

Preserve Your Shingles—Rich, Velvety, Lasting Colors

You are sure of beautiful coloring, durable wearing qualities and thorough preservation of the woodwork if you insist upon Cabot's Stains. Their colors are the strongest and finest natural pigments, ground in pure linseed oil and mixed in specially refined creosote, "the best wood preservative known." They will not wash off or blacken, and are the only stains that are not dangerously inflammable.

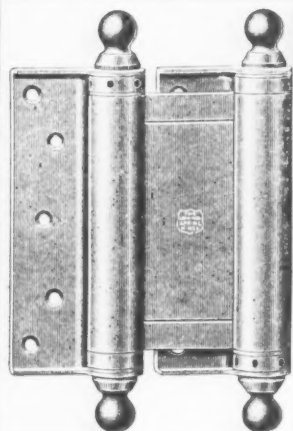
Cabot's Quilt

A scientific heat insulator and sound-deadener that makes houses warmer in winter and cooler in summer and deadens sound in floors and partitions. Not a mere felt or paper, but a non-conducting mat that is about thirty times warmer than common papers.

You can get Cabot's Stains and Quilt all over the country. Send for samples and names of nearest agents.

SAMUEL CABOT, Inc., Mfg. Chemists
BOSTON, MASS.

342 Madison Ave., New York 24 W. Kinzie St., Chicago
Cabot's Conserve Wood Preservative, Stucco Stains, Brick Stains, Damp-Proofing.



BOMMER

SPRING HINGES

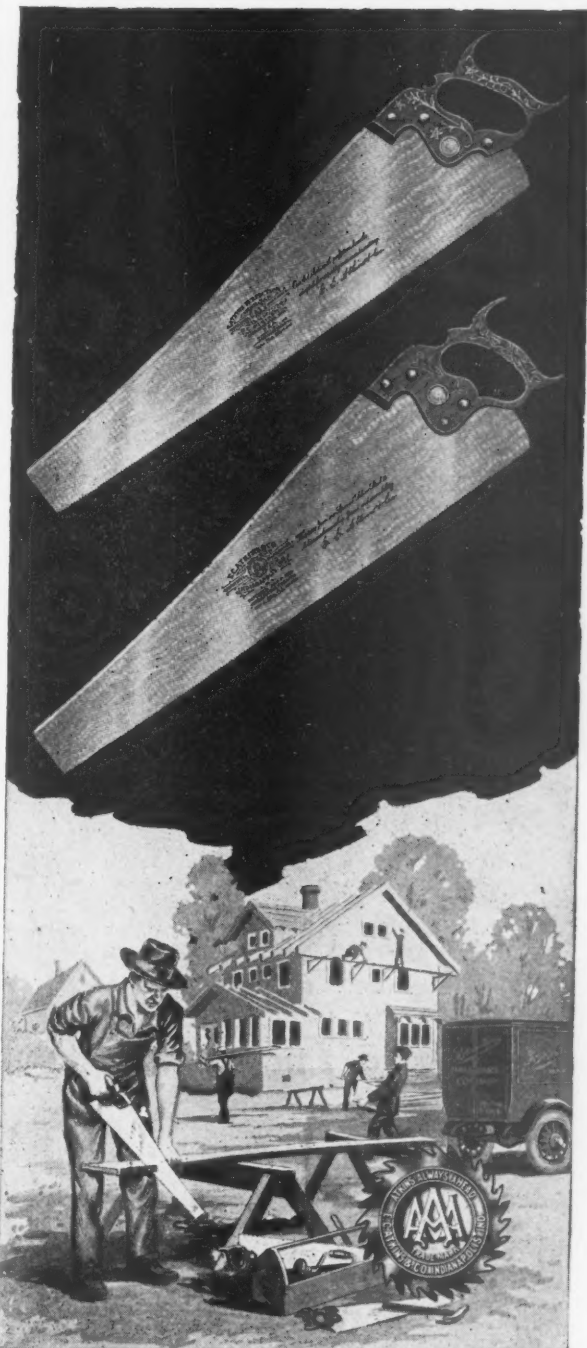
Standard for over 45 years, and steadily improved, retaining superiority over all others. In universal demand. Easiest to apply.

BOMMER SPRING HINGE COMPANY

**MANUFACTURERS,
BROOKLYN, N. Y.**

ATKINS

SILVER STEEL SAWS



Dependable Saws

IN ATKINS No. 53 Saw which is illustrated at the top of the picture you will find a Saw which is very popular. Made of Silver Steel, Taper Ground, finely polished, skew back, fitted with Atkins Perfection Handle. This Saw has been selected by master carpenters who want a free running, easy cutting Saw.

The other Saw is our No. 51, fitted with the old style straight across handle, and a leader in its class; preferred by men who want the best saw with this type of handle.

*Demand Atkins Silver Steel Saws
from your dealer. If he can
not supply you, write us*

Have you an Atkins Nail Apron?
They can be obtained from your
dealer for twenty-five cents.; pen-
cil and Saw Sense Book included.

E. C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE
Home Office and Factory, INDIANAPOLIS, INDIANA
Canadian Factory, Hamilton, Ontario
Machine Knife Factory, Lancaster, N. Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta	New Orleans	Seattle
Memphis	New York City	Paris, France
Chicago	Portland, Ore.	Sydney, N. S. W.
Minneapolis	San Francisco	Vancouver, B. C.

ing season is the animating inspiration of the show. Six years ago Cleveland building material men backed a similar show and that year was the greatest in a building way in all Cleveland's history. Coupled with Cleveland's tremendous shortage in housing facilities and the growing interest in building, the exposition is expected to have much the same effect upon local construction records next year. Last year the building investment in Greater Cleveland exceeded \$78,000,000.

Both floors of the new municipal auditorium will be used. The arena floor, which is the convention hall proper, will be devoted to the display of exterior structural materials, real estate, architecture, engineering and financing. The main exposition floor, which is especially equipped for exhibition purposes, will house all that goes inside a building, from the interior decorating, finishing and furnishing to every feature of equipment for the purposes of ornamentation, convenience and comfort. Here also will be a machinery department.

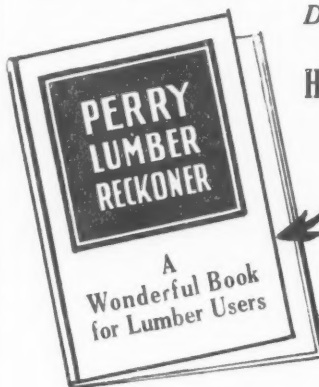
On the arena floor will be shown perhaps eight or ten finished cottages and bungalows in brick, frame and stucco. A ceiling height of 60 feet affords ample room for exceptional exhibits. Here the lumber interests will stage a mammoth community exhibit with a space cost alone of \$10,000. Two brick exhibits will tell the story of this material at a combined space cost of more than \$21,000. Other exhibits will be upon the same elaborate scale.

The Associated General Contractors plan to hold their next annual convention in Cleveland during the week of the exposition. The National Federation of Construction industries will likewise hold their annual convention here at that time, as will the Ohio Association of Builders' Exchanges.

Ralph P. Stoddard, who managed the 1916 show, is director general of the exposition and Richard G. Collier is assistant manager.

How many board feet in 96 pieces of 2x4--14?

Don't use
your pencil
HERE'S THE ANSWER



896

Which is shorter, surer, SAFER?—to figure board feet laboriously by pencil, risking profits on an error —OR to take 10 seconds to find the result in this book. A copyrighted "short cut" for lumber users. Gives at a glance the number of feet in any number of pieces, any size. This 106-page time saver will be sent on 5 days trial. **DO IT NOW.**

**5 DAYS
FREE TRIAL**

USE THE COUPON!

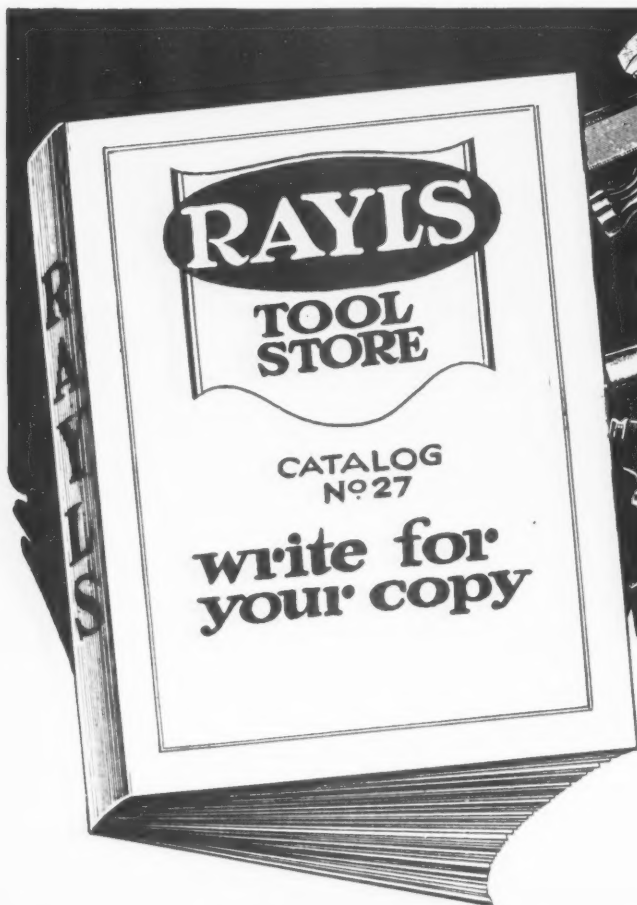
SEND NO MONEY!

Benjamin L. Jenks, 1212 Marshall Bldg., Cleveland, Ohio
You may send me one copy of the PERRY LUMBER RECKONER for my inspection. If the book is satisfactory I will send \$2.00 in 5 days. If the book is not what I want I agree to return it postpaid within 5 days of receipt.

NAME _____

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Books sent on approval to retail customers in the U. S. and Canada only. Use your letter head in writing. A. B.-11-21



This catalog of 350 pages should be in your possession. Every type of building tool is listed and in many different makes.

If you are interested in a new tool just look it up in Rayl's Tool Store catalog.

We will be glad to mail you this book Free on request.

T. B. RAYL COMPANY
Grand River at Woodward Detroit, Mich.

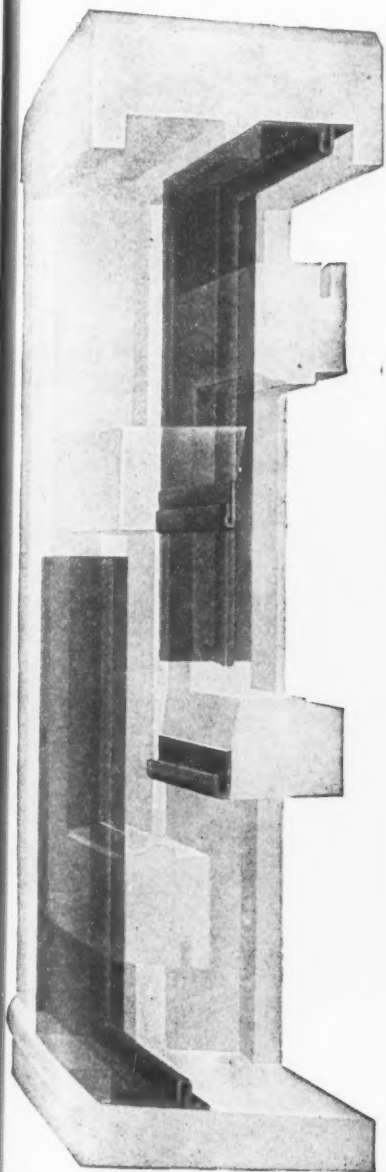
In the Days of Our Grandfathers

Rags and Old Papers were stuffed in the Cracks around Windows and Doors to keep out Cold, Wind, Storm and Dirt.

OUR FATHERS

Used Strips of Wood and Rubber or Felt which Wore Out, were Unsightly in Appearance and Inefficient

LOOKS LIKE OTHERS
BUT ENTIRELY DIFFERENT



X-Ray View of Window Showing
How it Appears Installed

We of Today

Demand that which is scientific in principle, practical in application, efficient in service and lasting in quality.

That's the "Why" of

Diamond Metal Weather Strips and Diamond Calking Compound

They Meet Every Requirement
Time Tested and Tried

Our Trade-Mark is Your Protection
Against Imitations

PRACTICAL THE METAL
DIAMOND
WEATHER WAY STRIPPING

(Registered)

See that your specifications read and your contractor installs "DIAMOND" Weather Strips and Calking Compound in the Windows and Doors of your New or Old Building.

CONTRACTORS, CARPENTERS
and Building Specialty Men will find a
"DIAMOND"

Agency Most Profitable

Some Very Desirable Territory
Still Open

Send for Our Agency Proposition
NOW — TODAY — Address

THE DIFFERENCE

The runway or side strip is made in two sections, a base with a foldover under which the rib interlocks and is held in place by a screw and mitre at sill or top.

To remove sash take out screw.

Only one side need be removed.

To replace sash just reverse operation.

After rib is removed if it is necessary to get into weight pocket it can be done without kinking or damage.

Our Equipments A, B, C, have this removable and flexible feature which is fully appreciated by carpenters and repair men.

Sash warp, swell and shrink and cause trouble by binding.

Parting stops or the dividing strip being exposed to the weather swell and bind the sash making it difficult to raise.

All this is avoided if

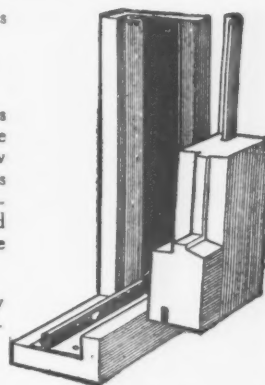
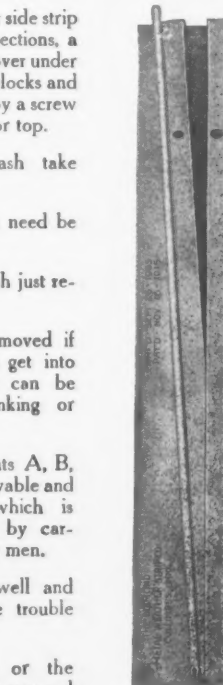
Diamond Flexible

strip is used as they are so made that they allow for these defects and adjust themselves to meet and overcome these objections.

That's why windows equipped with

Diamond Flexible

strips always slide easy.



Section Showing Removal
of Sash and "Flexible"
Strip at the same time.

The Diamond Metal Weather Strip Company

632 KERR STREET, COLUMBUS, OHIO

WESTERN FACTORY BRANCH

FORT DODGE, IOWA

Brasco

the BEST
in Copper Store Fronts

It is far easier to install the Best Copper Store Front and you will get a result that will mean other jobs.

If you know of a possible remodeling contract get in touch with us and we will help you land the job. Find out about **Brasco** now.

WRITE FOR BOOKLET A. B.

BRASCO MFG. CO.
5029 S. Wabash Ave. CHICAGO, ILL.




The Ideal Plastering Base

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Catalogs, Books and Bulletins Received

"Industrial Lighting" and "Lamp Equipment for Commercial and Industrial Lighting" are two subjects covered in the series of electrical salemen's handbooks prepared by the National Electric Light Association. These books contain a classification and description of the principal type of incandescent lighting equipment.

"Effect of Hydrated Lime and Other Powdered Admixtures in Concrete" is the title of Bulletin 8 issued by the Structural Materials Research Laboratory of the Lewis Institute, Chicago. It was prepared by Prof. Duff A. Abrams.

"Practical Business Methods for Engineers, Contractors and Architects" by Frank R. Walker, has just been published by the Frank R. Walker Co., Chicago. This 80-page book is a textbook on construction accounting, illustrating and describing forms and methods for all kinds of work. It also contains form for pay rolls, inventory, plant and equipment records, and contracts of various kinds. Price 50 cents.

"Home Lighting Suggestions" is a book of information of electric lighting problems issued by the Beardslee Chandelier Co., Chicago. It contains 32 pages well illustrated, showing well-lighted interior and the complete line of Beardslee fixtures.

The New Stanley Works General Catalog is now ready for distribution. This book contains 376 pages and covers the complete Stanley line of hardware. The Stanley Co., New Britain, Conn., has also issued a folder describing a new doweling jig, which can be obtained upon application.

"Stedman Naturized Flooring" is very completely described and illustrated in colors in a new six-page folder issued by the Stedman Products Co., South Braintree, Mass. This folder contains specifications for laying this rubber flooring and patterns in which it is made.

"Smith Snapshots" is the title of a 12-page illustrated booklet from the T. L. Smith Co., Milwaukee, Wis., showing their construction machinery on the job. The leading articles are "On the job with Smith Paving Mixers," "Studebaker Housing Projects" and "World's Greatest Engineering Projects."

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